St. Mary of the Angels
Catholic Primary School

Recognising and celebrating the presence of Christ in one another

Calculation Policy

Examples of calculation methods for each year group and the progression between each method.

Date: September 2019

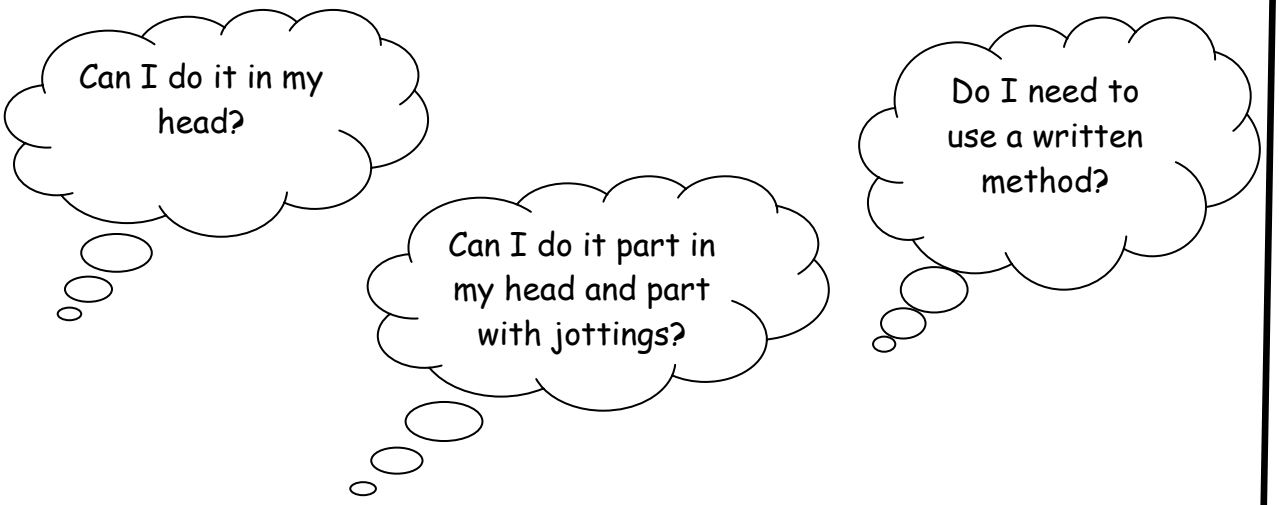
Introduction

The following calculation policy has been devised to meet the requirements of the National Curriculum 2014 and the EYFS Statutory Framework/Development Matters 2012 for the teaching and learning of mathematics. Its primary aim is to offer pupils a consistent and smooth progression in the teaching and learning of calculations across the school.

Age related expectations:
The calculation policy is organised according to age related expectations as set out in the National Curriculum 2014 and the EYFS Statutory Framework/ Development Matters 2012. We recognise however the importance of pupils being taught at a stage appropriate to their understanding. Some children may spend time working at a stage lower than the one specified for their year group until they are secure enough to move on. Equally, some children may be ready to gain greater mastery within their specific stage.

Providing a context for calculation:
At St Mary of the Angels Primary School, we believe it is important that any type of calculation is presented within a real life context or given in the form of a problem to be solved. This not only serves to help build children's understanding of the purpose of calculation, but also develops their ability to recognise what operations to use and when.

Choosing a calculation method:
Children need to be taught and encouraged to use the following thought processes when deciding what approach they will take to a calculation. Pupils need to select the most appropriate method for the numbers involved.



ADDITION

Year 1

Number - addition

Pupils should be taught to:

- Read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- Represent and use number bonds and related facts within 20
- Add one digit and two digit numbers to 20 including 0
- Solve one step problems that involve addition using concrete objects and pictorial representations, and missing number problems such as 7 = ? + 3

Key skills for addition at year 1

Pupils should be taught to:

- Count to and across 100, forwards and backwards beginning with 0 or 1, or from any given number
- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s
- Given a number, identify 1 more or 1 less
- Identify and represent numbers using objects and pictorial representations including the number line, and use language of: equal to, more than, less than (fewer), most, least
- Read and write numbers from 1 to 20 in numerals and words

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line.

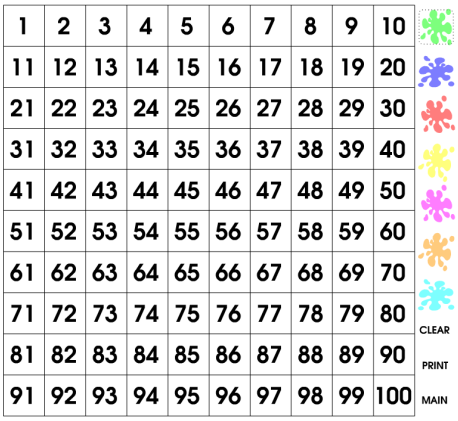
ADDITION

Year 1

Number - addition

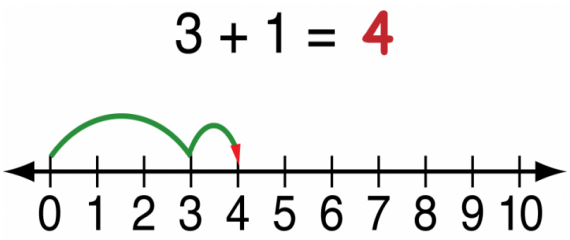
Add with numbers up to 20

Use number lines and hundred squares to add, by counting on in ones and tens. Encourage children to start with the larger number and count on.



1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

CLEAR
PRINT
MAIN



Key skills for addition at year 1

Children should:

- Have access to a wide range of counting equipment, everyday objects, number tracks and number lines, and be shown numbers in different contexts.
- Read and write the addition (+) and equals signs (=) signs within number sentences.
- Interpret addition number sentences and solve missing box problems using concrete objects and number line addition to solve them:

  8 + 3 = ☐ 15 + 4 = ☐ 5 + 3 + 1 = ☐

This builds on from prior learning of adding by combining two sets of objects into one group in Early Years.

Key Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line.

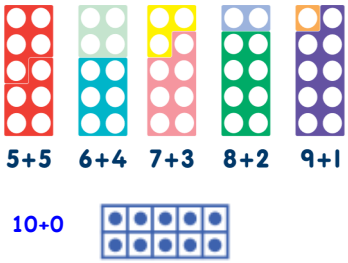
ADDITION

Year 1

Key skills for addition at year 1

Children should:

- Have access to a wide range of counting equipment, everyday objects, number tracks and number lines, and be shown numbers in different contexts.
- Concrete and pictorial representations could include:



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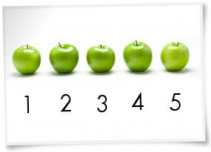
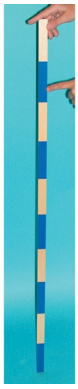
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

CLEAR
PRINT
MAIN





Key Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line.

ADDITION

Year 2

Number - addition

Pupils should be taught to:

- Rapidly recall and use addition and subtraction facts to 20.
- Add and subtract numbers with up to two 2-digits including using column addition without carrying and column subtraction without borrowing.
- Add and subtract numbers mentally including:
  - A 2-digit number and ones
  - A 2-digit number and tens
  - A two 2-digit numbers
- Use subtraction in 'take away' and 'find the difference' problems.
- Recognise and show that addition can be done in any order (commutative) and that subtraction cannot.
- Recognise and use addition and subtraction as inverse operations including to check answers.
- Solve word problems with addition and subtraction with numbers up to 2-digits.

Key skills for addition at year 2

Pupils should be taught to:

- Recall bonds to 20 and bonds of tens to 100 (30+70etc)
- Count in steps of 2, 3 and 5 and count in tens to 100 from any number.
- Understand the value of 2- digit numbers (tens and ones/units)
- Compare and order numbers to 100 using < > and = signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers quantities and measures, and applying mental and written methods.

Key Addition Vocabulary

Add, more, plus, and, make,

altogether, total equal to, equals, double, most, count on, number line.

Sum, tens, units, partition, addition, column tensboundary

ADDITION

Year 2

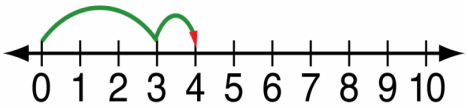
Number - addition

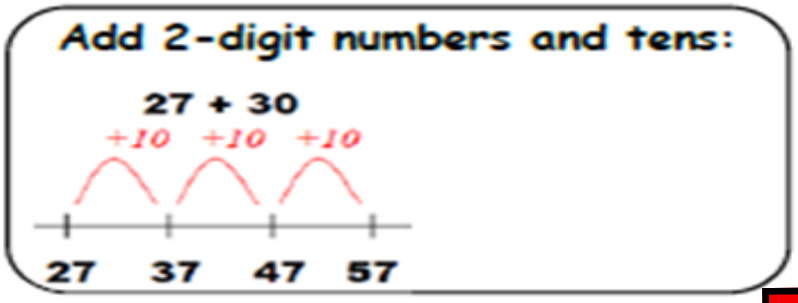
Add with 2 digit numbers developing mental fluency with addition and place value involving 2 digit numbers, then using number lines and hundred squares move towards more formal methods.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

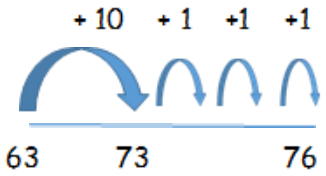
CLEAR
PRINT
MAIN

3 + 1 = 4





Add pairs of 2-digit numbers, moving to the partitioned method when secure adding tens and units:



23 + 34

20 + 3

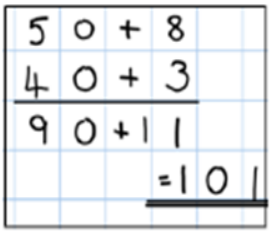
30 + 4

50 + 7

Step 1: Only provide examples that do NOT cross the tens boundary until they are secure with the method itself.

STEP 2: Once children can add a multiple of ten to a 2-digit number mentally (e.g. 80+11), they are ready for adding pairs of 2-digit numbers that DO cross the tens boundary (e.g. 58 + 43).

58 + 43:



STEP 3: Children who are confident and accurate with this stage should move onto the expanded addition methods with 2 and 3-digit numbers (see Y3).

Key Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line.

Sum, tens, units, partition, addition, column tensboundary

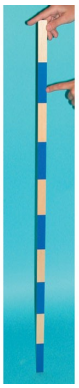
ADDITION

Year 2

Number - addition

Key skills for addition at year 2:

- Add a 2-digit number and ones (e.g. 27+6)
- Add a 2-digit number and tens (e.g. 23+40)
- Add pairs of 2-digit numbers (e.g. 35+47)
- Add three single digit numbers (e.g. 5+9+7)
- Show that addition can be done in any order (the commutative law)
- Recall bonds to 20 and bonds of tens to 100 (30 + 70 etc)
- Count in steps of 2, 3 and 5 and count in tens from any number
- Understand the place value of 2-digit numbers (tens and ones)
- Compare and order numbers to at least 100 in numerals and words
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.



Key Vocabulary

Add, more, plus, and, make,

altogether, total equal to, equals, double, most, count on, number line.

Sum, tens, units, partition, addition, column tensboundary

ADDITION

Year 3

Number - addition

Pupils should be taught to:

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

Key skills for addition at year 3

Pupils should be taught to:

- Count from 0 in multiples of 4, 8, 25, 50 and 100; find 10 or 100 more or less than a given number up to 999
- Recognise the place value of each digit in a three digit number (hundreds, tens, ones)
- Compare and order numbers up to 1000
- Identify, represent and estimate numbers using different representations
- Read and write numbers up to 1000 in numerals and words
- Solve number problems and practical problems involving these ideas

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line. Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact

ADDITION

Year 3

Number - addition, add numbers with up to three digits.
Use formal methods of partitioning.

236 + 73 = 200 + 30 + 6
70 + 3
200 + 100 + 9 = 309

Move to the compact **column addition** method, with carrying:

Add **units** first.

'**Carry**' numbers **underneath** the bottom line.

$$\begin{array}{r} 236 \\ +\ 73 \\ \hline 309 \\ \hline 1 \end{array}$$

Children who are very secure and confident with 3-digit expanded column addition should be moved onto the **compact column addition** method, being introduced to carrying for the first time. Compare the expanded method to the compact column method to develop an understanding of the process and the reduced number of steps involved.

Remind pupils the actual value is '**three tens** add **seven tens**', not '**three add seven**', which equals **ten** tens.

Key skills for addition at year 3

- Read and write numbers to 1000 in numerals and words.
- Add 2-digit numbers mentally, incl. Those exceeding 100.
- Add 3-digit number and ones mentally (175 + 8)
- Add 3-digit number and tens mentally (249 + 50)
- Add 3-digit number and hundreds mentally (381 + 400)
- Estimate answers to calculations, using inverse to check answers
- Solve problems, including missing number problems, using number facts, place value, and more complex addition
- Recognise place value of each digit in a 3-digit number (hundreds, tens, ones)
- Continue to practice a wide range of mental addition strategies. i.e. Number bonds, adding the nearest multiple of 10, 100, 1000 and adjusting using near doubles, partitioning and recombining.

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line. Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact

ADDITION

Year 4

Number - addition

Pupils should be taught to:

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

Key skills for addition at year 4

Pupils should be taught to:

- Count in multiples of 6, 7, 9, 25 and 1000
- Find 1000 more or less than a given number
- Count backwards through zero to include negative numbers
- Recognise the place value of each digit in a four digit number (thousands, hundreds, tens and ones)
- Order and compare numbers beyond 1000
- Identify, represent and estimate numbers using different representations
- Round any number to the nearest 10, 100 or 1000
- Solve number and practical problems that involve all of the above and with increasingly large positive numbers
- Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line.
Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse

ADDITION

Year 4

Number - addition, add numbers with up to 4-digits using partitioning and formal written methods.

236 + 73 =
200 + 30 + 6
70 + 3
200 + 100 + 9 = 309

Year 4 Add numbers with up to 4 digits

Move from expanded addition to the compact column method, **adding units first**, and **'carrying'** numbers **underneath** the calculation. Also include money and measures contexts.

e.g. 3517 + 396 = 3913

```
  3 5 1 7
+   3 9 6
  3 9 1 3
```

Introduce the **compact column addition** method by asking children to add the two given numbers together using the method that they are familiar with (**expanded column addition—see Y3**). Teacher models the compact method with carrying, asking children to discuss similarities and differences and establish how it is carried out. Make sure that pupils draw a line underneath the final calculation.

Add units first.

'Carry' numbers **underneath** the bottom line.

Reinforce correct place value by reminding them the actual value is **5 hundreds** add **3 hundreds**, **not 5 add 3**, for example.

Use and apply this method to money and measurement values.

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line.
Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse

Key skills for addition at year 4

- Select most appropriate method: mental, jottings or written and explain why
- Recognise the place value of each digit in a 4-digit number
- Round any number to the nearest 10, 100 or 1000
- Estimate and use inverse operations to check answers
- Solve two step problems in context, deciding which operations and methods to use and why
- Find 1000 more or less than a given number
- Continue to practice a wide range of mental addition strategies. i.e. Number bonds, add the nearest multiple of 10, 100, 1000 and adjust, use near doubles, partitioning and recombining
- Add numbers with up to 4-digits using the formal written method of column addition
- Solve 2-step problems in context, deciding which operations and methods to use and why.

ADDITION

Year 5

Number - addition

Pupils should be taught to:

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

Key skills for addition at year 5

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000
- Solve number problems and practical problems that involve all of the above
- Read Roman numerals to 1000 (M) and recognise years written in Roman numerals

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line. Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

ADDITION

Year 5

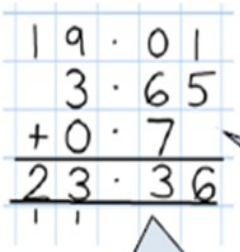
Number - addition, add numbers with more than 4 digits

Year 5 Add numbers with more than 4 digits

including money, measures and decimals with different numbers of decimal places.

The decimal point should be aligned in the same way as the other place value columns, and must be in the same column in the answer. (Keep reminding pupils about the line under the final calculation)

Numbers should exceed 4 digits.



Pupils should be able to add more than two values, carefully aligning place value columns.

Say '**6 tenths add 7 tenths**' to reinforce place value.

Empty decimal places can be filled with zero to show the place value in each column.

Children should:

- Understand the place value of **tenths and hundredths** and use this to align numbers with different numbers of decimal places.

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line. Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

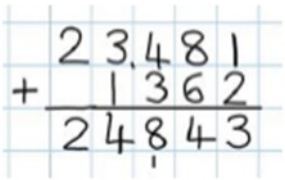
ADDITION

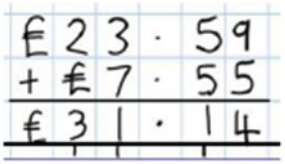
Year 5

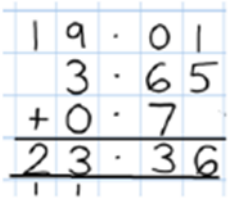
Number - addition

Key skills for addition at year 5:

- Add numbers mentally with increasingly large numbers, using and practicing a range of mental strategies. i.e. Add the nearest multiple of 10, 100, 1000 and adjust; use near doubles, inverse, partitioning and re-combining; using number bonds
- Use rounding to check answers and accuracy
- Solve multi-step problems in context, deciding which operations and methods to use and why
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000
- Add numbers with more than 4 digits using formal written method of column addition.







Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line. Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

ADDITION

Year 6

Number - addition Pupils should be taught to:

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

Key skills for addition at year 6

Pupils should be taught to:

- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals across zero
- Solve number and practical problems that involve all of the above.

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line.
Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

ADDITION

Year 6

Number - addition, add several numbers of increasing complexity

Year 6 Add several numbers of increasing complexity

	2	3 ·	3	6	1
		9 ·	0	8	0
	5	9 ·	7	7	0
+		1 ·	3	0	0
	9	3 ·	5	1	1
	2	1	2		

Empty decimal places can be filled with zero to show the place value in each column.

Adding several numbers with different numbers of decimal places (including money and measures):

- Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically including in the answer row.
- Zeros could be added into any empty decimal places, to show there is no value to add.

	8	1,	0	5	9
		3,	6	6	8
	1	5,	3	0	1
+	2	0,	5	5	1
1	2	0,	5	7	9
	1	1	1	1	

Adding several numbers with more than 4 digits.

Key Addition Vocabulary

Add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line. Sum, tens, units, partition, addition, column tensboundary humdreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

Key skills for addition at year 6:

- Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies
- Solve multi-step problems in context, deciding which operations and methods to use and why
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Read, write, order and compare numbers up to 10 million and determine the value of each digit, plus round answers accurately.

SUBTRACTION

Year 1

Number - subtraction

Pupils should be taught to:

- Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Subtract one digit and two digit numbers to 20 including 0
- Solve one step problems that involve subtraction and addition using concrete objects and pictorial representations, and missing number problems such as 7 = ? - 9

Key skills for subtraction at year 1

Pupils should be taught to:

- Count to and across 100, forwards and backwards beginning with 0 or 1, or from any given number
- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s
- Given a number, identify 1 more or 1 less
- Identify and represent numbers using objects and pictorial representations including the number line, and use language of: equal to, more than, less than (fewer), most, least
- Read and write numbers from 1 to 20 in numerals and words

Key subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ?

SUBTRACTION

Year 1

Number - subtraction, subtraction from numbers up to 20

Year 1 Subtract from numbers up to 20

Children consolidate understanding of subtraction practically, showing subtraction on bead strings, using cubes etc. and in familiar contexts, and are introduced to more formal recording using number lines as below:

Read, write and interpret number sentences with - and = signs.

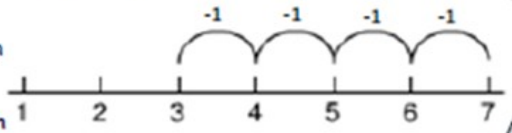
Understanding is developed firstly using 100 squares counting forwards and back across boundaries.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

CLEAR PRINT MAIN

Subtract by taking away

Count back in ones on a numbered number line to take away, with numbers up to 20:

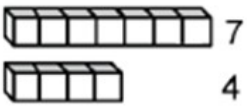


$7 - 4 = 3$

Model subtraction using hundred squares and numbered number lines/tracks and practically.

Find the 'distance between'

This will be introduced practically with the language 'find the distance between' and ,how many more? in a range of familiar contexts.



Seven is 3 more than four

I am 2 years older than my sister

Mental subtraction

Children should start recalling subtraction facts up to **and within** 10 and 20, and should be able to subtract zero.

Key Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ?

Key skills for subtraction at year 1

- Given a number, say one more or one less
- Count to and over 100, forward and back, from any number
- Represent and use subtraction facts to 20 and within 20
- Subtract with 1-digit and 2-digit numbers to 20, including zero
- Solve one step problems that involve addition and subtraction, using concrete objects , pictures and missing number problems
- Read and write numbers from 0 to 20 in numerals and words.

SUBTRACTION

Year 2

Number - subtraction

Pupils should be taught to:

- Solve problems with subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures. Apply increasing knowledge of mental and written methods
- Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100
- subtract numbers using concrete objects and mentally including:
  - A 2-digit number and ones
  - A 2-digit number and tens
  - A two 2-digit numbers
- Use subtraction in 'take away' and 'find the difference' problems.
- Recognise and show that addition can be done in any order (commutative) and that subtraction cannot.
- Recognise and use addition and subtraction as inverse operations including to check answers.
- Solve word problems with addition and subtraction with numbers up to 2-digits.

Key skills for subtraction at year 2

Pupils should be taught to:

- Recall bonds to 20 and bonds of tens to 100 (30+70etc)
- Count in steps of 2, 3 and 5 and count in tens to 100 from any number.
- Understand the value of 2- digit numbers (tens and ones/units)
- Compare and order numbers to 100 using < > and = signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers quantities and measures, and applying mental and written methods.

Key subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units

SUBTRACTION

Year 2

Number - subtraction, subtract with 2-digit numbers

Year 2 Subtract with 2-digit numbers

Subtract on a number line by counting back, aiming to develop mental subtraction skills.

Use Dienes blocks for subtraction calculations too.

This strategy will be used for:

- **2-digit numbers subtract units** (by taking away / counting back) e.g. 36—7
- **2-digit numbers subtract tens** (by taking away / counting back) e.g. 48—30
- **Subtracting pairs of 2-digit numbers** (see below:)

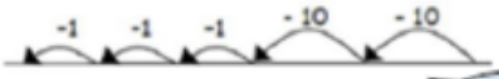
Hundred squares are used to consolidate understanding of counting forwards and back across boundaries in ones and tens.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

CLEAR PRINT MAIN

Subtracting pairs of 2-digit numbers on a number line:

47 - 23 = 24 Partition the second number and subtract it in tens and units, as below:



24 25 26 27 37 47

Subtract tens first.

Then subtract units.

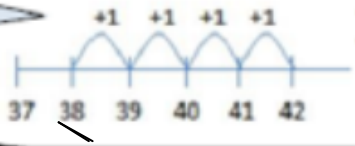
Combine methods with use of a hundred square to reinforce understanding of number value and order.

Teaching children to **bridge through ten** can help them to become more efficient, for example 42—25:

Mental strategy - subtract numbers close together by **counting on:**

Start with the smaller number and count on to the largest.

42 – 38 = 4



Many mental strategies are taught. Children are taught to recognise that when numbers are close together, it is more efficient to count on the difference. They need to be clear about the relationship between addition and subtraction.

Key skills for subtraction at year 2:

- Recognise the place value of each digit in a two digit number.
- Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100.
- Subtract using concrete objects, pictorial representations, 100 squares and mentally, including; a two digit number and ones, a two digit number and tens, and two two digit number.
- Show that subtraction of one number from another cannot be done in any order.
- Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.
- Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation, and applying increasing knowledge of mental and written methods.
- Read and write numbers to at least 100 in numerals and in words.

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units

SUBTRACTION

Year 3

Number - subtraction

Pupils should be taught to:

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

Key skills for subtraction at year 3

Pupils should be taught to:

- Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- Recognise the place value of each digit in a three digit-number (hundreds, tens, ones)
- Compare and order numbers up to 1000
- Identify, represent and estimate numbers using different representations
- Read and write numbers up to 1000 in numerals and words
- Solve number problems and practical problems involving these ideas

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit

SUBTRACTION

Year 3

Number - subtraction, add numbers with up to three digits

Year 3 Subtracting with 2 and 3-digit numbers.

Introduce **partitioned column subtraction** method.

STEP 1· introduce this method with examples where **no exchanging** is required.

89 - 35 = 54

80 + 9
- 30 + 5
50 + 4

When learning to „exchange, explore „partitioning in different ways so that pupils understand that when you exchange, the **VALUE** is the same i.e. **72** = 70+2 = 60+12 = 50+22 etc. Emphasise that the **value hasn't changed**, we have just partitioned it in a different way.

STEP 2· introduce „exchanging" through practical subtraction. Make the larger number with Base 10, then subtract 47 from it.

72 - 47

60
~~70~~ + 12
- 40 + 7
20 + 5 = **25**

Before subtracting '7' from the 72 blocks, they will need to exchange a row of 10 for ten units. Then subtract 7, and subtract 4 tens.

STEP 3· Once pupils are secure with the understanding of "exchanging", they can use the partitioned column method to subtract any 2 and 3-digit numbers.

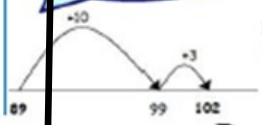
238 - 146 = 92

100
~~200~~ + 130 + 8
- 100 + 40 + 6
0 + 90 + 2

Subtracting money partition into e.g. £1 + 30p + 8p

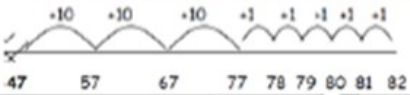
Counting on as a mental strategy for subtraction:

Because counting on in tens is the way we use a 100 square.



Continue to reinforce counting **on** as a strategy for **close-together numbers** (e.g. 121—118), and also for numbers that are nearly multiples of 10, 100, 1000 or £'s, which make it easier to count on (e.g. 102-89, 131—79, or calculating change from £1 etc.).

Start at the smaller number and count on in tens first, then count on in units to find the rest of the difference:



Key skills for subtraction at year 3

- Subtract mentally a: 3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds
- Estimate answers and use inverse operations to check
- Solve problems including missing number problems
- Find 10 or 100 more or less than any given number
- Counting up differences as a mental strategy when numbers are close together or near multiples of 10
- Read write numbers up to 1000 in numerals and words
- Practice mental strategies, such as subtracting near multiples of 10 and adjusting

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit

SUBTRACTION

Year 4

Number - subtraction

Pupils should be taught to:

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

Key skills for subtraction at year 4

- Count in multiples of 6, 7, 9, 25 and 1000
- Find 1000 more or less than a given number
- Count backwards through zero to include negative numbers
- Recognise the place value of each digit in a four digit number (thousands, hundreds, tens and ones)
- Order and compare numbers beyond 1000
- Identify, represent and estimate numbers using different representations
- Round any number to the nearest 10, 100 or 1000
- Solve number and practical problems that involve all of the above and with increasingly large positive numbers
- Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse

SUBTRACTION

Year 4

Number - subtraction, subtract with up to 4-digit numbers

Year 4 Subtract with up to 4-digit numbers

Partitioned column subtraction with exchanging (decomposition):

2754 − 1562 = 1192

600

2000 + ~~700~~ + 150 + 4

− 1000 + 500 + 60 + 2

1000 + 100 + 90 + 2

As introduced in Y3, but moving towards more complex numbers and values. Use place value counters to reinforce 'exchanging'.

Subtracting money: partition into £1 + 30 + 5 for example.

Compact column subtraction (see video)

6

2 7 1 5 4

− 1 5 6 2

1 1 9 2

To introduce the compact method, ask children to perform a subtraction calculation with the familiar partitioned column subtraction then display the compact version for the calculation they have done. Ask pupils to consider how it relates to the method they know, what is similar and what is different, to develop an understanding of it

Give plenty of opportunities to apply this to money and measures.

Always encourage children to consider the best method for the numbers involved— mental, counting on, counting back or written method

Mental strategies

A variety of mental strategies must be taught and practised, including counting on to find the difference where numbers are closer together, or where it is easier to count on

Approximate,

Calculate,

Check it mate!

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit inverse

Key skills for subtraction at year 4

- Subtract by counting on where numbers are close together or they are near multiples of 10, 100 etc.
- Children select the most appropriate and efficient methods for given subtraction calculations.
- Estimate and use inverse operations to check answers.
- Solve addition and subtraction 2-step problems, choosing which operations and methods to use and why.
- Solve simple measure problems involving fractions and decimals to two decimal places.
- Find 1000 more or less than a given number.
- Count backwards through zero, including negative numbers.
- Recognise place value of each digit in a 4-digit number. Round any number to the nearest 10, 100 or 1000
- Solve number problems that involve the above with increasingly large positive numbers.

SUBTRACTION

Year 5

Number - subtraction

Pupils should be taught to:

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

Key skills for subtraction at year 5

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000
- Solve number problems and practical problems that involve all of the above
- Read Roman numerals to 1000 (M) and recognise years written in Roman numerals

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit inverse, tenths, hundredths, decimal point, decimal

SUBTRACTION

Year 5

Number - subtraction, subtract with at least 4-digit numbers

Year 5 Subtract with at least 4-digit numbers

including money, measures, decimals.

Compact column subtraction

(with 'exchanging').

	2	10	0	5	6
−		2	1	2	8
	2	8,	9	2	8

Children who are still not secure with number facts and place value will need to remain on the partitioned column method until ready for the compact method.

Subtracting with larger integers.

6	7	10	6	9	0
−		3	7	2	5
	6	7	9	6	5

Subtract with decimal values, including mixtures of integers and decimals, aligning the decimal point.

Add a zero in any empty decimal places to aid understanding of what to subtract in that column.

Create lots of opportunities for subtracting and finding differences with money and measures.

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit inverse, tenths, hundredths, decimal point, decimal

Key skills for subtraction at year 5

- Subtract numbers mentally with increasingly large numbers
- Use rounding and estimation to check answers to calculations and determine, in a range of context, levels of accuracy
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 million
- Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through zero
- Round any number up to 1 million to the nearest 10, 100, 1000, 10,000 and 100,000

SUBTRACTION

Year 6

Number - subtraction Pupils should be taught to:

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

Key skills for subtraction at year 6

Pupils should be taught to:

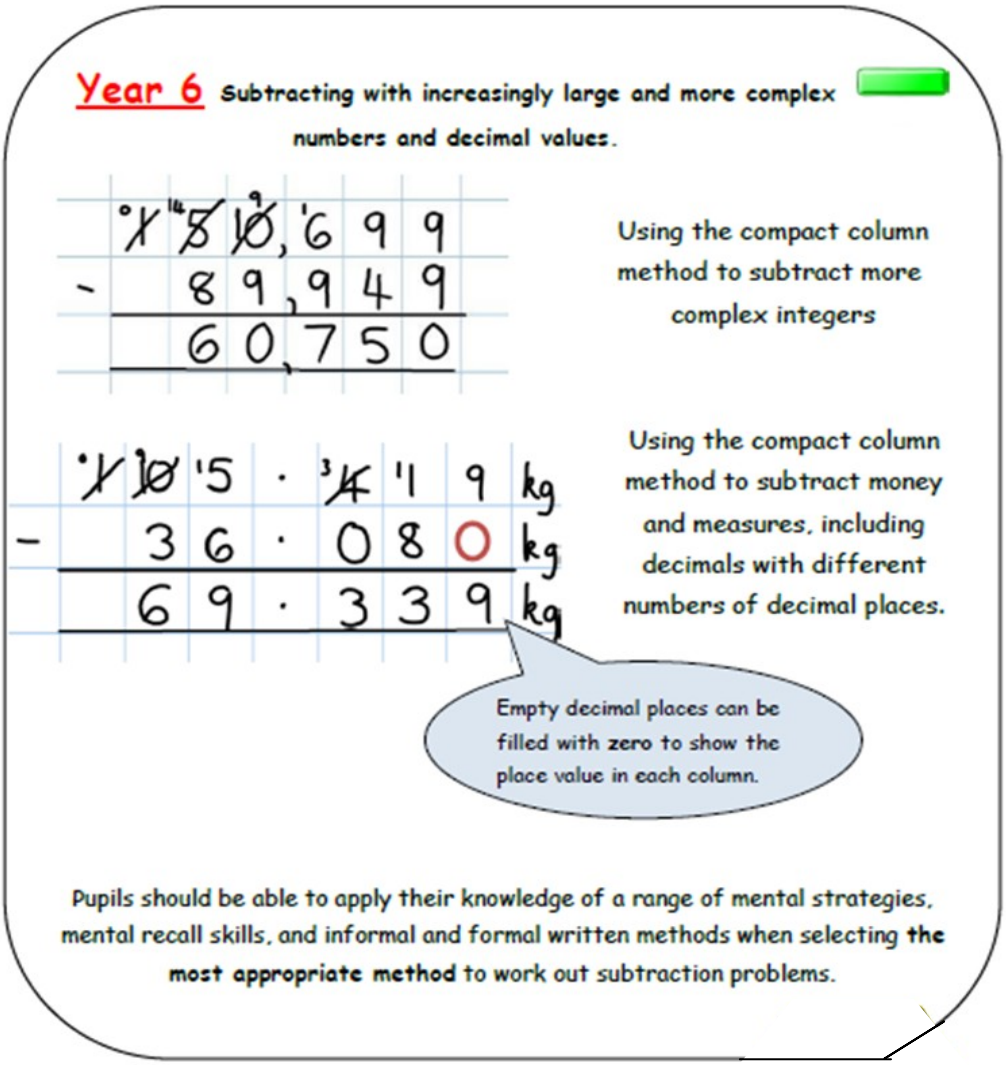
- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals across zero
- Solve number and practical problems that involve all of the above.

Key Addition Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit inverse, tenths, hundredths, decimal point, decimal

SUBTRACTION

Year 6 Number - subtraction, subtract several numbers of increasing complexity



Key skills for subtraction at year 6:

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit
- Round and whole number to a required degree of accuracy.
- Use negative numbers in context, and calculate intervals across zero
- Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before calculating.

Key Subtraction Vocabulary

Equal to, take, takeaway, less, minus, subtract, leaves, distance between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ? Difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit inverse, tenths, hundredths, decimal point, decimal

MULTIPLICATION

Year 1

Number - multiplication

Pupils should be taught to:

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

Non-statutory

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

Key skills for multiplication at year 1

Pupils should be taught to:

- Count to and across 100, forwards and backwards beginning with 0 or 1, or from any given number
- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s
- Given a number, identify 1 more or 1 less
- Identify and represent numbers using objects and pictorial representations including the number line, and use language of: equal to, more than, less than (fewer), most, least
- Read and write numbers from 1 to 20 in numerals and words

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count,

MULTIPLICATION

Year 1

Number - multiplication, Multiply with concrete objects, arrays and pictorial representations and 100 squares.

Year 1 Multiply with concrete objects, arrays and pictorial representations.

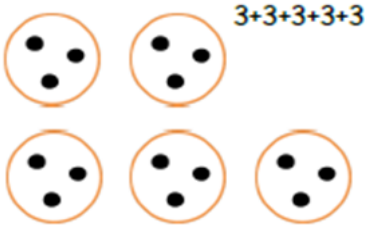
How many legs will 3 teddies have?

Rectangle

2 + 2 + 2 = 6

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

There are 3 sweets in one bag. How many sweets are in 5 bags altogether?



3+3+3+3+3 = 15

- Give children experience of counting equal group of objects in 2s, 5s and 10s.
- Present practical problem solving activities involving counting equal sets or groups, as above.

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count,

Key skills for multiplication at year 1

Pupils should be taught to:

- Count in multiples of 2,5 and 10
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
- Make connections between arrays, number patterns, and counting in twos, fives and tens
- Begin to understand doubling using concrete objects and pictorial representations.

MULTIPLICATION

Year 2

Number - multiplication

Pupils should be taught to:

- Recall and use multiplication facts for the 2,5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication within the multiplication tables and write them using multiplication (x) and equals (=) signs
- Show that multiplication of two numbers can be done in any order (commutative) law.
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in context.

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times...

Key skills for multiplication at year 2

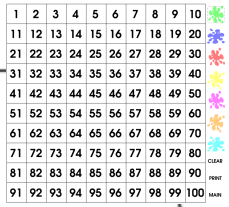
Pupils should be taught to:

- Recall bonds to 20 and bonds of tens to 100 (30+70etc)
- Count in steps of 2, 3 and 5 and count in tens to 100 from any number.
- Understand the value of 2- digit numbers (tens and ones/units)
- Compare and order numbers to 100 using < > and = signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers quantities and measures, and applying mental and written methods.

MULTIPLICATION

Year 2

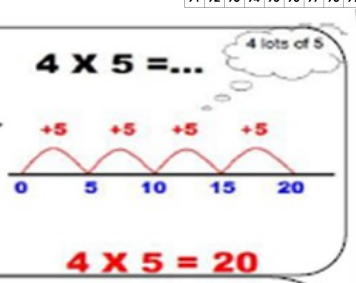
Number - multiplication, multiply using arrays, 100 squares and repeated addition (using at least 2s, 5s, and 10s)



Year 2 Multiply using arrays and repeated addition (using at least 2s, 5s and 10s)

Use repeated addition on a number line:

Starting from zero, make equal jumps up on a number line to work out multiplication facts and write multiplication statements using x and = signs.



Use arrays:

5 x 3 = 15

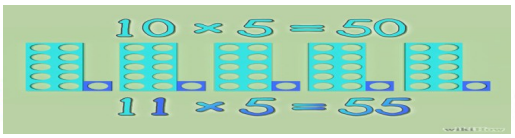
3 x 5 = 15

5 x 3 = 3 + 3 + 3 + 3 = 15

3 x 5 = 5 + 5 + 5 = 15

Use arrays to help teach children to understand the commutative law of multiplication, and give examples such as 3 x __ = 6.

Use practical apparatus:



Use mental recall:

Children should begin to recall multiplication facts for 2, 5 and 10 times tables through practice in counting and understanding of the operation.

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times...

Key skills for multiplication at year 2

- Count in steps of 2, 3 and 5 from zero, and in 10s from any number.
- Recall and use multiplication facts from the 2, 5 and 10 times tables, including recognising odds and evens.
- Write and calculate number statements using the x and = signs
- Show that multiplication can be done in any order (commutative)
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods and multiplication facts.
- Pupils use a variety of language to discuss and describe multiplication.

MULTIPLICATION

Year 3

Number - multiplication

Pupils should be taught to:

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

Key skills for multiplication at year 3

Pupils should be taught to:

- Count from 0 in multiples of 4, 8, 25, 50 and 100; find 10 or 100 more or less than a given number
- Recognise the place value of each digit in a three digit-number (hundreds, tens, ones)
- Compare and order numbers up to 1000
- Identify, represent and estimate numbers using different representations
- Read and write numbers up to 1000 in numerals and words
- Solve number problems and practical problems involving these ideas

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value

MULTIPLICATION

Year 3

Number - multiplication, multiply 2-digits by a single digit number

Year 3 Multiply 2-digits by a single digit number

Introduce the grid method for multiplying 2-digit by single-digits:

Eg. 23 x 8 = 184

X	20	3
8	160	24

160 + 24 = 184

Link the layout of the grid to an array initially:

123 x 5

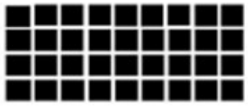
x	100	20	3
5	500	100	15

500
+ 100
+ 15
615

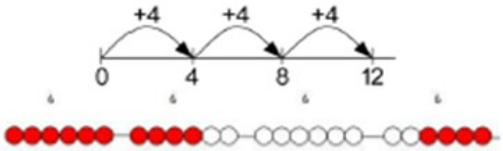
Introduce the grid method with children physically making an array to represent the calculation (e.g. make 8 lots of 23 with 10s and 1s place value counters), then translate this to grid method format (see video clip).

To do this, children must be able to:

- Partition numbers into tens and units
- Multiply multiples of ten by a single digit (e.g. 20 x 4) using their knowledge of multiplication facts and place value
- Recall and work out multiplication facts in the 2, 3, 4, 5, 8 and 10 times tables.
- Work out multiplication facts not known by repeated addition or other taught mental strategies (e.g. by commutative law, working out near multiples and adjusting, using doubling etc.) Strategies to support this are: repeated addition using a number line, bead bars and arrays:



9 x 4 = 36



Key skills for multiplication at year 3

- Recall and use multiplication facts for the 2, 3, 4, 5, 8 and 10 times tables, and multiply multiples of 10.
- Write and calculate number statements using the times tables they know, including 2-digit x single-digit, drawing upon mental methods, and progressing to reliable written methods.
- Solve multiplication problems, including missing number problems
- Develop strategies using commutativity (e.g. 4 x 12 x 5 = 4 x 5 x 12 = 20 x 12 = 240)
- Solve simple problems in context, deciding which operations and methods to use
- Develop efficient methods to solve including missing number problems.

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value

MULTIPLICATION

Year 4

Number - multiplication

Pupils should be taught to:

- Recall multiplication facts for multiplication tables up to 12 x 12
- Use place value, known derived facts to multiply mentally, including multiplying by 0 and 1; dividing by 1 and multiplying together three numbers
- Recognise and use factor pairs and commutativity in mental calculations
- Multiply 2-digit and 3-digit numbers by 1-digit numbers 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.

Key skills for multiplication at year 4

- Count in multiples of 6, 7, 9, 25 and 1000
- Find 1000 more or less than a given number
- Count backwards through zero to include negative numbers
- Recognise the place value of each digit in a four digit number (thousands, hundreds, tens and ones)
- Order and compare numbers beyond 1000
- Identify, represent and estimate numbers using different representations
- Round any number to the nearest 10, 100 or 1000
- Solve number and practical problems that involve all of the above and with increasingly large positive numbers
- Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value, inverse

MULTIPLICATION

Year 4

Number - multiplication, multiply 2-digits by a single digit number

Year 4 Multiply 2 and 3-digits by a single digit, using all multiplication tables up to 12 x 12

Developing the grid method:

Eg. 136 x 5 = 680

X	100	30	6
5	500	150	30

500
150
+ 30
680

Encourage column addition to add accurately.

Move onto **short multiplication** when children are confident and accurate multiplying 2 and 3-digit numbers by a single digit this way, **and** are already confident in **'carrying'** for written addition.

Children should be able to:

- **Approximate before they calculate**, and make this a regular part of their calculating, going back to the approximation to check the reasonableness of their answer. e.g: **346 x 9** is approximately 350 x 10 = **3500**
- Record an approximation to check the final answer against
- Multiply multiples of ten and one hundred by a single-digit, using their multiplication table knowledge
- Recall all times tables up to 12 x 12.

Approximate,
Calculate,
Check it mate!

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value, sets of, inverse

Key skills for multiplication at year 4

- Count in multiples of 6, 7, 9, 25 and 1000
- Recall multiplication facts for all multiplication tables up to 12 x 12
- Recognise place value of digits in up to 4-digit numbers
- Use place value, known facts and derived facts to multiply mentally, e.g. Multiply by 1, 10, 100, by 0, or to multiply 3 numbers
- Use commutativity and other strategies mentally 3 x 6 = 6 x 3, 2 x 6 x 5 = 10 x 6, 39 x 7 = 30 x 7 + 9 x 7
- Solve problems with increasingly complex multiplication in a range of contexts
- Count in multiples of 6, 7, 9, 25 and 1000
- Recognise the place value of each digit in a 4-digit number.

MULTIPLICATION

Year 5

Number - multiplication

Pupils should be taught to:

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers up to 4-digits and by a 1 or 2-digit number using formal written method, including long multiplication for 2-digit numbers
- Multiply and divide numbers mentally drawing upon known facts
- Divide numbers up to 4 digit by one-digit number using the formal written method or short division and interpret remainders appropriately for the context
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value, sets of, inverse, square, factor, integer, decimal, short/long multiplication, carry

Key skills for multiplication at year 5

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000
- Solve number problems and practical problems that involve all of the above
- Read Roman numerals to 1000 (M) and recognise years written in Roman numerals

MULTIPLICATION

Year 5

Number - multiplication, multiply up to 4-digits by 1 or 2 digits

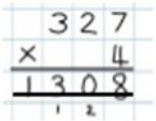
Year 5 Multiply up to 4-digits by 1 or 2 digits.

Consolidate column multiplication

- Introduce by comparing a grid method calculation to a short multiplication method, to see how the steps are related, but notice how there are less steps involved in the column method (see video).
- Children need to be taught to approximate first, e.g. for **72 x 38, they will use rounding;** 72 x 38 is approximately 70 x 40 = 2800, and use the approximation to check the reasonableness of their answer against.

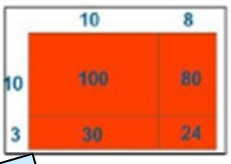
Short multiplication for multiplying by a single digit

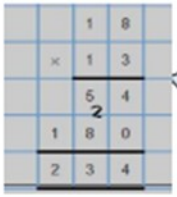
x	300	20	7
4	1200	80	28



Pupils could be asked to work out a given calculation using the grid, and then compare it to their column method. What are the similarities and differences? Unpick the steps and show how it reduces the steps.

Introduce long multiplication for multiplying by 2 digits





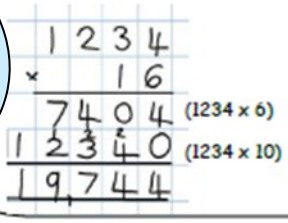
18 x 3 on the 1st row

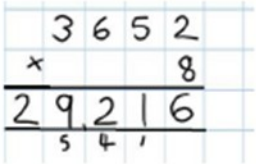
(8 x 3 = 24, carrying the 2 for twenty, then 1 x 3).

18 x 10 on the 2nd row. Put a zero in units first, then say 8 x 1, and 1 x 1.

The grid could be used to introduce long multiplication, as the relationship can be seen in the answers in each row.

Moving towards more complex numbers:





Approximate, Calculate, Check it mate!

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value, sets of, inverse, square, factor, integer, decimal, short/ long multiplication, carry

Key skills for multiplication at year 5

- Identify multiples and factors, using knowledge of multiplication tables to 12 x 12.
- Solve problems where larger numbers are decomposed into their factors.
- Multiply and divide integers and decimals by 10, 100 and 1000
- Recognise and use square and cube numbers and their notation
- Solve problems involving combinations of operations, choosing and using calculations and methods appropriately.

MULTIPLICATION

Year 6

Number - multiplication

Pupils should be taught to:

- Multiply multi-digit numbers up to 4 digits by a 2 digit whole number using the formal written method of long multiplication.
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Use their knowledge of the order of operations to carry out calculations involving the four operations.

Key skills for multiplication at year 6

Pupils should be taught to:

- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals across zero
- Solve number and practical problems that involve all of the above.

Key Multiplication Vocabulary

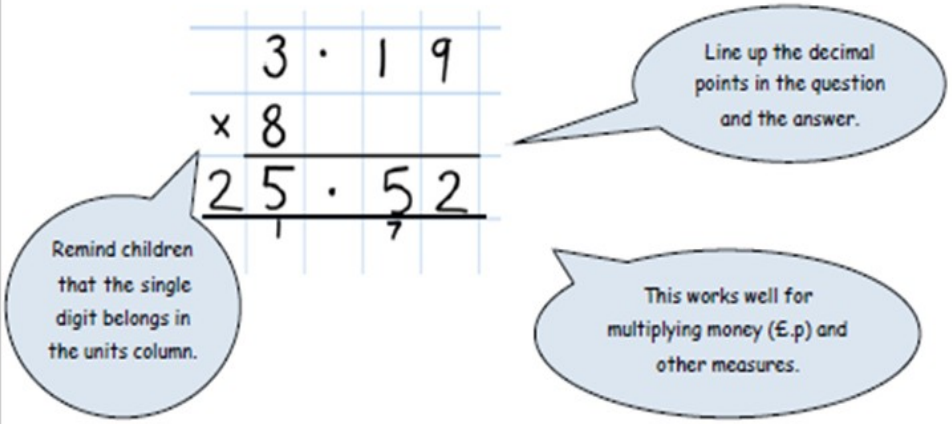
Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value, sets of, inverse, square, factor, integer, decimal, short/long multiplication, carry, tenths, hundredths, decimal

MULTIPLICATION

Year 6

Number - multiplication, short and long multiplication as in yr5, and multiply decimals with up to 2d.p by a single digit.

Year 6 Short and long multiplication as in Y5, and multiply decimals with up to 2d.p by a single digit.



Children will be able to:

- Use rounding and place value to make approximations before calculating and use these to check answers against.
- Use short multiplication (see Y5) to multiply numbers with more than 4-digits by a single digit; to multiply money and measures, and to multiply decimals with up to 2d.p. by a single digit.
- Use long multiplication (see Y5) to multiply numbers with at least 4 digits by a 2-digit number.

Approximate, Calculate, Check it mate!

Key Multiplication Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times… partition, grid method, multiple, product, tens, units, value, sets of, inverse, square, factor, integer, decimal, short/ long multiplication, carry

Key skills for multiplication at year 6

- Recall multiplication facts for all times tables up to 12 x 12 (as yr 4 and yr5).
- Multiply multi-digit numbers, up to 4-digit x 2-digit using long multiplication.
- Perform mental calculations with mixed operations and larger numbers.
- Solve multi-step problems in range of context, choosing appropriate combinations of operations and methods.
- Estimate answers using round and approximation and determine levels of accuracy.
- Round any integer to a required degree of accuracy.

DIVISION

Year 1

Number - division

Pupils should be taught to:

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

Non-statutory

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

Key skills for division at year 1

Pupils should be taught to:

- Count to and across 100, forwards and backwards beginning with 0 or 1, or from any given number
- Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s
- Given a number, identify 1 more or 1 less
- Identify and represent numbers using objects and pictorial representations including the number line, and use language of: equal to, more than, less than (fewer), most, least
- Read and write numbers from 1 to 20 in numerals and words

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array

DIVISION

Year 1

Number - division, Multiply with concrete objects, arrays and pictorial representations.

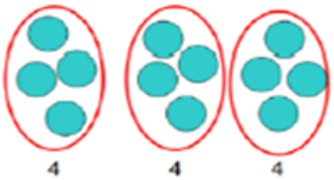
Year 1 Group and share small quantities

Use objects, diagrams and pictorial representations to solve problems involving **both grouping and sharing**.

How many groups of 4 can be made with 12 stars? = 3

Grouping:

Sharing:



12 shared between 3 is 4

Example division problem in a familiar context:

There are 6 pupils on this table and there are 18 pieces of fruit to share between us. If we share them equally, how many will we each get?

Can they work it out and give a division statement… ?

"18 shared between 6 people gives you 3 each."

Pupils should:

- use lots of practical apparatus, arrays and picture representations
- be taught to understand the difference between **grouping** objects (How many groups of 2 can you make?) and **sharing** (Share these sweets between 2 people)
- be able to count in multiples of 2s, 5s and 10s
- find **half** of a group of objects by sharing into 2 equal groups.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array

Key skills for division at year 1

Pupils should be taught to:

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations arrays with the support of the teacher.
- Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

DIVISION

Year 2

Number - division

Pupils should be taught to:

- Recall and use division facts for the 2,5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for division within the multiplication tables and write them using multiplication (x), division (÷) and equals (=) signs
- Show that multiplication of two numbers can be done in any order (commutative) and division of one 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 context.

Key skills for division at year 2

Pupils should be taught to:

- Recall bonds to 20 and bonds of tens to 100 (30+70etc)
- Count in steps of 2, 3 and 5 and count in tens to 100 from any number.
- Understand the value of 2- digit numbers (tens and ones/units)
- Compare and order numbers to 100 using < > and = signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers quantities and measures, and applying mental and written methods.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over

DIVISION

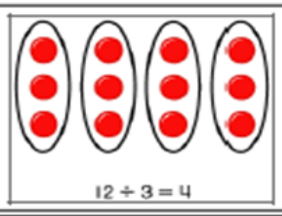
Year 2

Number - division. Group and share, using the ÷ and = sign

Year 2 Group and share, using the ÷ and = sign

Use objects, arrays, diagrams and pictorial representations, and grouping on a number line.

Arrays:

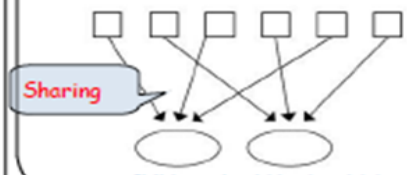


This represents 12 ÷ 3, posed as how many groups of 3 are in 12?

Pupils should also show that the same array can represent 12 ÷ 4 =3 if grouped horizontally.

Know and understand sharing and grouping:

6 sweets shared between 2 people, how many do they each get?



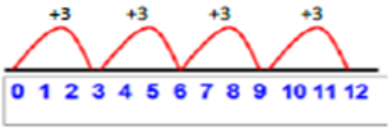
Grouping

There are 6 sweets, how many people can have 2 sweets each?

Children should be taught to recognise whether problems require sharing or grouping.

Grouping using a number line:

Group from zero in equal jumps of the divisor to find out "how many groups of _ in _ ?. Pupils could and using a bead string or practical apparatus to work out problems like "A CD costs £3. How many CDs can I buy with £12?" This is an important method to develop understanding of division as grouping.



12 ÷ 3 = 4

Pose 12 ÷ 3 as "How many groups of 3 are in 12?"

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over

Key skills for division at year 2

Pupils should be taught to:

- Count in steps of 2, 3 and 5 from 0
- Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication and division within the times tables and write them using the x, ÷ and = signs.
- Show that the commutative law does not work with division.
- Solve problems involving division using materials, arrays, repeated addition, mental methods and division facts.

DIVISION

Year 3

Number - division

Pupils should be taught to:

- Recall and use division facts for the 3, 4 and 8 times tables
- Write and calculate mathematical statements for 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.

Key skills for division at year 3

Pupils should be taught to:

- Recall bonds to 20 and bonds of tens to 100 (30+70etc)
- Count in steps of 2, 3 and 5 and count in tens to 100 from any number.
- Understand the value of 2– digit numbers (tens and ones/units)
- Compare and order numbers to 100 using < > and = signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers quantities and measures, and applying mental and written methods.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple

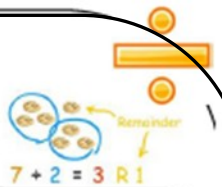
DIVISION

Year 3

Number - division. Divide 2-digit numbers by single digit numbers

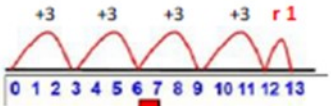
Year 3 Divide 2-digit numbers by a single digit

(where there may be a remainder in the final answer)



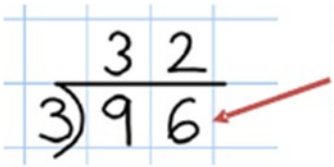
Grouping on a number line:

13 ÷ 3 = 4 r 1

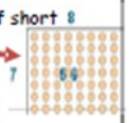


STEP 1· Children continue to work out unknown division facts by grouping on a number line from zero. They are also now taught the concept of remainders, as in the example. This should be introduced practically and with arrays, as well as being translated to a number line. Children should work towards calculating some basic division facts with remainders mentally for the 2s, 3s, 4s, 5s, 8s and 10s, ready for carrying remainders across within the short division method.

Short division: Limit numbers to NO remainders in the answer OR carried (each digit must be a multiple of the divisor).



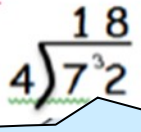
STEP 2· Once children are secure with division as grouping and demonstrate this using number lines, arrays etc., short division for larger 2-digit numbers should be introduced, initially with carefully selected examples requiring no calculating of remainders at all. Start by introducing the layout of short division by comparing it to an array.



Remind children of correct place value, that 96 is equal to 90 and 6, but in short division, pose·

- *How many 3's in 9? = 3, and record it above the 9 tens.*
- *How many 3's in 6? = 2, and record it above the 6 units.*

Short division: Limit numbers to NO remainders in the final answer, but with remainders occurring within the calculation.



STEP 3· Once children demonstrate a full understanding of remainders, and also the short division method taught, they can be taught how to use the method when remainders occur within the calculation (e.g. 96÷4), and be taught to carry the remainder onto the next digit. If needed, children should use the number line to work out individual division facts that occur which they are not yet able to recall mentally.

Step 3 Only taught when pupils can calculate remainders

Real Life contexts need to be used routinely to help pupils gain a full understanding and the ability to recognise the place of division and how to apply it to problems.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, **divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiiple**

Key skills for division at year 3

Pupils should be taught to:

- Recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 times tables.
- Write and calculate mathematical statements for multiplication and division using times table and formal written methods.
- Solve problems, in context, including missing number problems, involving multiplication and division.
- Pupils develop reliable written methods and efficient mental methods for division progressing to the formal written short division method.

DIVISION

Year 4

Number - division

Pupils should be taught to:

- Recall division facts for multiplication tables up to 12 x 12
- Use place value, known derived facts to divide mentally, including dividing by 0 and 1; dividing by 1 and multiplying together three numbers
- Divide 2-digit and 3-digit numbers by 1-digit numbers 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.

Key skills for division at year 4

- Count in multiples of 6, 7, 9, 25 and 1000
- Find 1000 more or less than a given number
- Count backwards through zero to include negative numbers
- Recognise the place value of each digit in a four digit number (thousands, hundreds, tens and ones)
- Order and compare numbers beyond 1000
- Identify, represent and estimate numbers using different representations
- Round any number to the nearest 10, 100 or 1000
- Solve number and practical problems that involve all of the above and with increasingly large positive numbers
- Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor

DIVISION

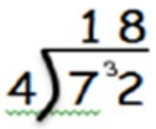
Year 4

Number - division. Divide up to 3-digits numbers by a single digit
(without remainders initially)

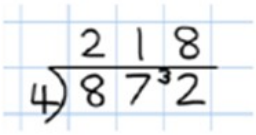
Year 4 Divide up to 3-digit numbers by a single digit
(without remainders initially)

Continue to develop short division

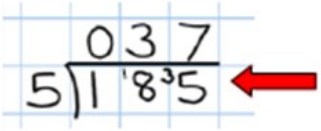
Short division should only be taught once children have secured the skill of calculating „remainders".



STEP 1: Pupils must be secure with the process of short division for dividing 2-digit numbers by a single digit (those that do not result in a final remainder —see steps in Y3), but must understand how to calculate remainders, using this to carry remainders within the calculation process (see example).



STEP 2: Pupils move onto dividing numbers with up to 3-digits by a single digit, however, problems and calculations provided should not result in a final answer with remainder at this stage. Children who exceed this expectation may progress to Y5 level.



When the answer for the first column is zero (1 ÷ 5, as in example), children could initially write a zero above to acknowledge its place, and must always carry the number (1) over to the next digit as a remainder.

Include money and measure contexts when confident.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, **divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor**

Key skills for division at year 4

Pupils should be taught to:

- Recall multiplication and division facts for all numbers up to 12 x 12.
- Use place value, known and derived facts to multiply and divide mentally including by 10, 100 and 1
- Pupils practise to become fluent in the formal written method of short division
- Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers.

DIVISION

Year 5

Number - division

Pupils should be taught to:

- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4-digits and by a 1 or 2-digit number using formal written method, including long multiplication for 2-digit numbers
- Multiply and divide numbers mentally drawing upon known facts
- Divide numbers up to 4 digit by one-digit number using the formal written method or short division and interpret remainders appropriately for the context
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000

Key skills for division at year 5

- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit
- Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000
- Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000
- Solve number problems and practical problems that involve all of the above
- Read Roman numerals to 1000 (M) and recognise years written in Roman numerals

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, **divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime)**

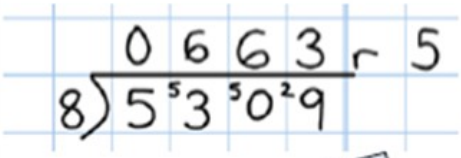
DIVISION

Year 5

Number - division. Divide up to 4 digits by a single digit, including those with remainders

Year 5 Divide up to 4 digits by a single digit, including those with remainders.

Short division, including remainder answers:



Short division with remainders: Now that pupils are introduced to examples that give rise to remainder answers, division needs to have a real life problem solving context, where pupils consider the meaning of the remainder and how to express it, i.e. as a fraction, a decimal, or as a rounded number or value, depending upon the context of the problem.

The answer to 5309 ÷ 8 could be expressed as 663 and five eighths, 663 r 5, as a decimal, or rounded as appropriate to the problem involved.

See Y6 for how to continue the short division to give a decimal answer for children who are confident.

Include money and measure contexts.

Approximate,
Calculate,
Check it mate!

If children are confident and accurate:

- Introduce **long division** for pupils who are ready to divide any number by a 2-digit number (e.g. 2678 ÷ 19). This is a Y6 expectation—see Y6

Key skills for division at year 5

Pupils should be taught to:

- Recall multiplication and division facts for all numbers up to 12 x 12.
- Multiply and divide numbers mentally, drawing upon known facts.
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.
- Solve problems involving multiplication and division where larger numbers are decomposed into their factors.
- Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.
- Work out whether a number up to 100 is prime, and recall prime numbers to 19.
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders.
- Use multiplication and division as inverses
- Solve problems involving all four operations.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, **divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime)**

DIVISION

Year 6

Number - division

Pupils should be taught to:

- 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.
- Divide numbers up to 4 digits by a two digit number using the formal written method of short division where appropriate, interpreting remainders
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Use their knowledge of the order of operations to carry out calculations involving the four operations.
- Solve multi-step problems in context, deciding which operations to use and why.

Key skills for division at year 6

Pupils should be taught to:

- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals across zero
- Solve number and practical problems that involve all of the above.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, **divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime), common factor**

DIVISION

Year 6

Number - division Divide at least 4 digits by both single-digit and 2-digit numbers (including decimal numbers and quantities)

Year 6 Divide at least 4 digits by both single-digit and 2-digit numbers (including decimal numbers and quantities)

Short division, for dividing by a single digit: e.g. 6497 ÷ 8

```
   0 8 1 2·1 2 5
8)6 4 9 7·0 0 0
```

Short division with remainders: Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real life problem solving contexts need to be the starting point, where pupils have to consider the most appropriate way to express the remainder.

Calculating a decimal remainder: In this example, rather than expressing the remainder as r 1, a decimal point is added after the units because there is still a remainder, and the one remainder is carried onto zeros after the decimal point (to show there was no decimal value in the original number). Keep dividing to an appropriate degree of accuracy for the problem being solved. Pupils to be instructed to extend the division line as they add zeros.

Must be aligned in place value for subtracting

Introduce long division by chunking for dividing by 2 digits.

```
      27
36 ) 972
   - 720
     252
   - 252
       0
```

Answer : 27

20 lots of 36

7 lots of 36

20 + 7

Find out "How many 36s are in 972?" by subtracting chunks of 36, until zero is reached (or until there is a remainder). Teach pupils to write a 'useful list', first at the side that will help them decide what chunks to use, e.g.:

'Useful list' 1x = 36
10x = 360
100x = 3600

Introduce the method in a simple way by limiting the choice of chunks to "Can we use 10 lots? Can we use 100 lots?" As children become confident with the process, encourage more efficient chunks to get to the answer more quickly (e.g. 20x, 5x), and expand on their 'useful' lists.

Where remainders occur, pupils should express them as fractions, decimals or use rounding, depending upon the problem.

Approximate, Calculate, Check it mate!

Key skills for division at year 6

- Divide numbers up to 4 digits by two-digit whole numbers using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Use short division where appropriate.
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Solve problems involving all four operations.
- Use estimation to check answers to calculations and determine accuracy.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specific degrees of accuracy.

Key Division Vocabulary

Share, share equally, one each, two each…, group, groups of, lots of, array, **divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime), common factor**