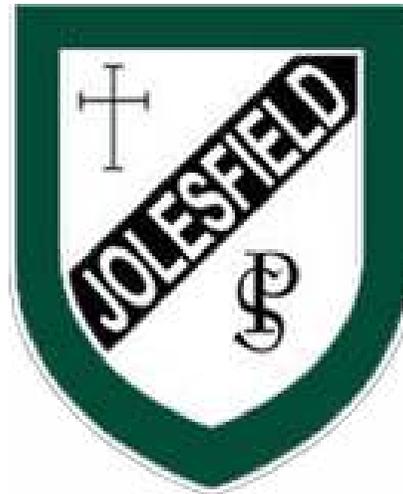


# Jolesfield CofE Primary School

## Progression in Calculation





Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. ... pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.  
National Curriculum 2014

Purpose of the Policy:

- To make teachers and parents aware of the strategies that pupils are formally taught within each year group that will support them to perform mental and written calculations. Pupils should not move on through the methods until they have secured and understood how to use the methods, including the concrete and pictorial representations.
- The policy supports teachers in identifying appropriate concrete apparatus and pictorial representations to help develop and secure understanding.

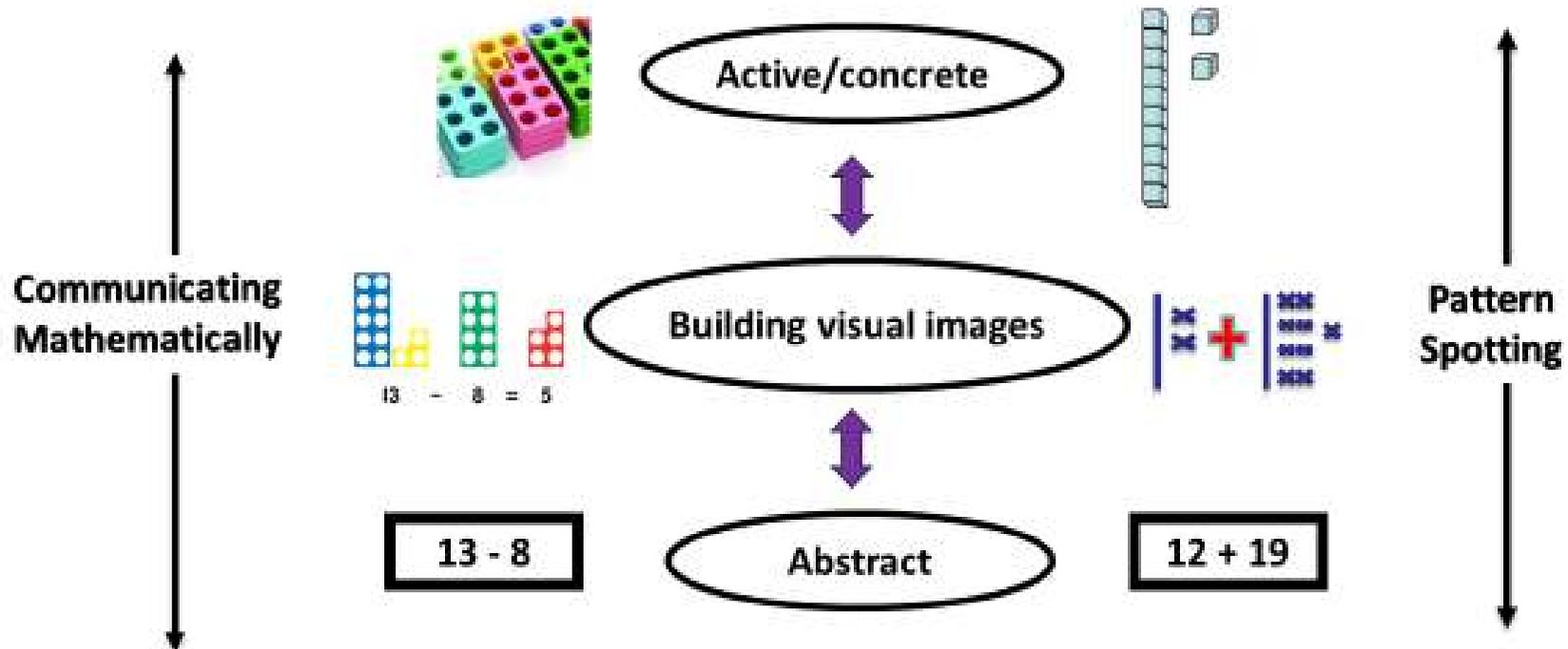
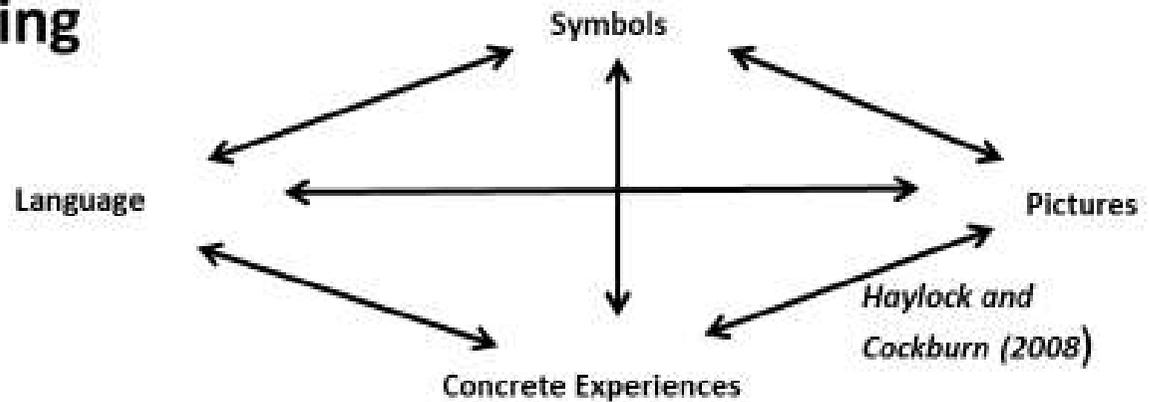
Aims of the policy:

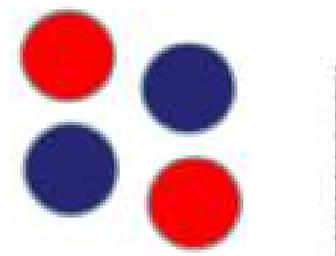
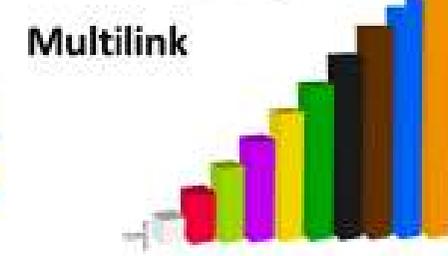
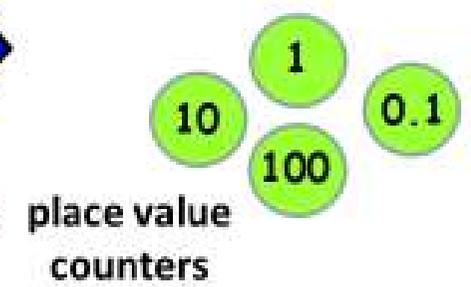
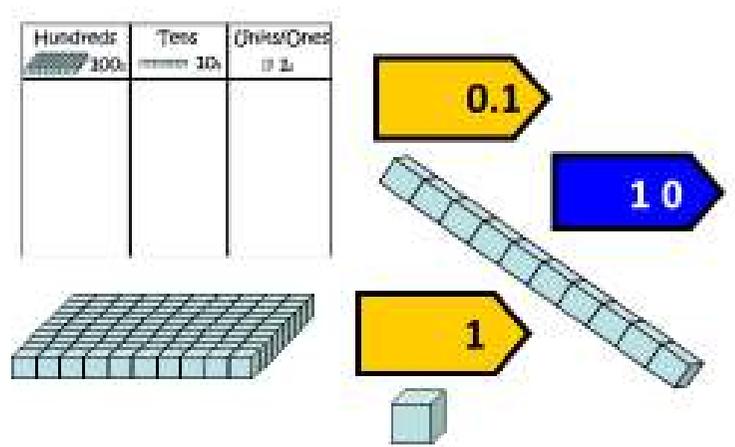
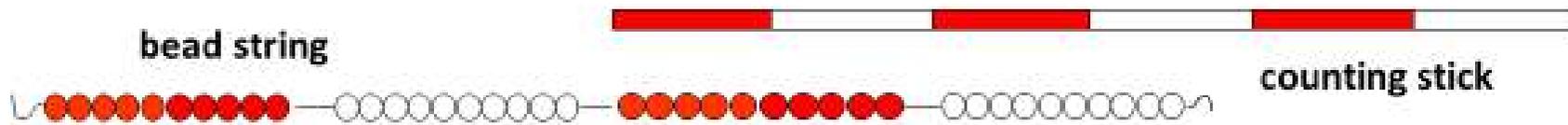
- To ensure consistency and progression in our approach to calculation.
- To ensure that children develop an efficient, reliable, formal written method of calculation for all operations.
- To ensure that children can use these methods accurately with confidence and understanding.

Preferred Terminology	Incorrect Terminology
Ones	Units
Is equal or equivalent to	The same as
zero	Oh (the letter O)
Exchange, exchanging, regrouping	Stealing, borrowing, popping next door to the neighbour for a pint of milk, etc...
Calculation, equation	Generic term of sum or number sentence
Known, unknown	
Whole, part	

# Structuring Learning

*Children must have concrete experiences that enable them to create visual images. They should be encouraged to articulate their learning and to become pattern spotters.*





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
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

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



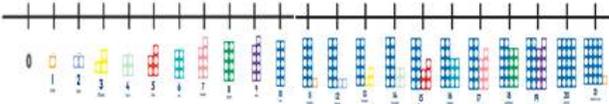
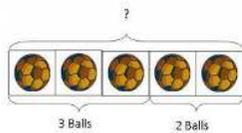
**number grids**  
100 and 200

# + Addition + Add, Plus, Parts and wholes, Total, More, Sum, Altogether, 'Is equal to', 'Is the same as'.

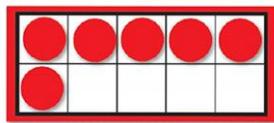
## Year R



Use pictures, objects, tens frames, cubes and other concrete resources to begin to add two numbers together as a group or in a bar.



"one more than three is four. One less than four is three"



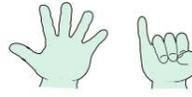
## Year 1

As year R plus:

Teach all the number bonds up to and including 10 and the related 'Fact Family' for each fact.

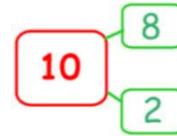
$$10 = 6 + 4 \quad 4 + 6 = 10$$

$$10 - 4 = 6 \quad 10 - 6 = 4$$



$$6 + ? = 10 \quad ? + 6 = 10$$

$$10 - 6 = ? \quad 10 - 4 = 6$$

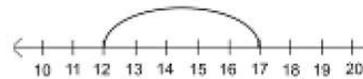
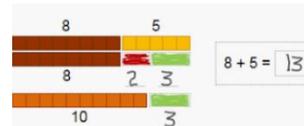


Use concrete objects to combine groups to add and solve missing number problems.  $2 + \_ = 10$  Show this using the part/whole model.

Understand place value – can partition numbers and recombine numbers using concrete and pictorial.

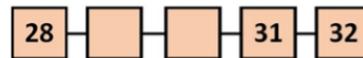


Usually start with the **biggest** number (if counting on)  
 $12 + 5 = 17$



Start at the larger number on the number line and count on in ones or in one jump to find the answer.

Find missing numbers on number track, focusing on tens boundaries.



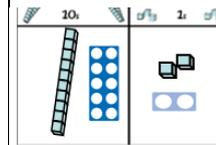
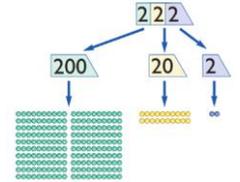
## Year 2

As year 1 plus:

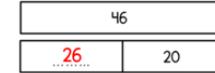
Addition can be done in any order (commutative)  
 $34 + 56$  or  $56 + 34$

Understand place value – can partition numbers & recombine numbers

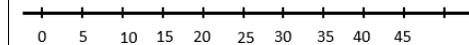
$$37 = 30 + 7 \quad 30 + 7 = 37$$



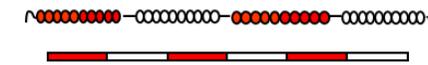
Cuisenaire



Bar Model



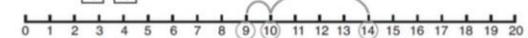
Numbered and partially numbered number lines



Use partitioning to add numbers, first with concrete apparatus (base ten/ numicon/ coins) then using written methods including bar models.

Have a range of mental methods for calculating first with numbers to 20, then with numbers to 100 e.g. breaking numbers apart to use them flexibly, this may be with a bridging strategy (e.g.  $7 + 5$  could be thought of as  $7 + 3 + 2$  or  $5 + 5 + 2$ ), a compensating strategy (e.g.  $7 + 9$  could be thought of as  $7 + 10$  then  $-1$ ) or by using a near double (e.g.  $7 + 8 = 14 + 1$ ).

$$9 + 5 = 14$$



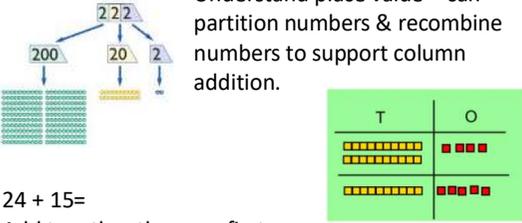
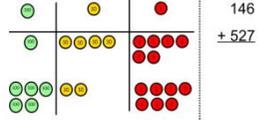
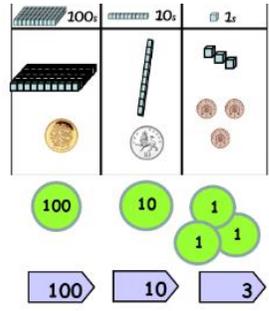
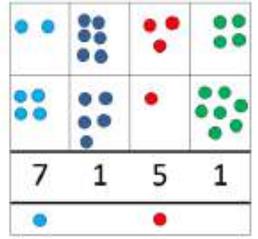
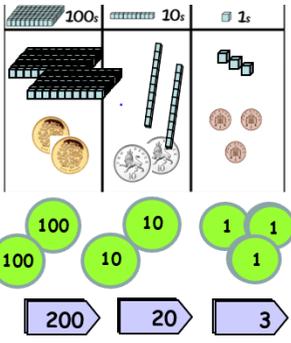
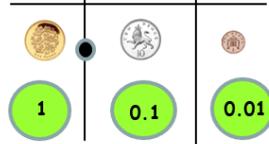
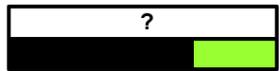
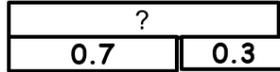
$$4 + 7 + 6 = 10 + 7$$

$$= 17$$

Learn to add three numbers  $4 + 7 + 6 = 17$ . Put 4 and 6 together to make 10. Add on 7.

<p><b><u>EYFS end of year expectations</u></b>  Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.  Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.</p>	<p><b><u>NC Year 1 end of year expectations</u></b>  Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs  Represent and use number bonds and related subtraction facts within 20  Add and subtract one-digit and two-digit numbers to 20, including zero  Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>8 + \_ = 13</math>  Children must experience combining two, and then more than two, groups of objects using counting on and the language of addition e.g. add, plus</p>	<p><b><u>NC Year 2 end of year expectations</u></b>  Solve problems with addition and subtraction:  - using concrete objects and pictorial representations, including those involving numbers, quantities, measures, money and real-life contexts  -applying their increasing knowledge of mental and written methods  Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100  Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers, adding three one-digit numbers  Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot  Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.  Children should understand the language of sum  <b>ENSURE CHILDREN HAVE THE OPPORTUNITY TO ADD MORE THAN TWO NUMBERS</b></p>
<p><b><u>Fluency required by end of year R</u></b>  Count forward in ones,  Be able to add one more  Read digits up to 20  Match written numbers to number of objects  Order concurrent numbers up to 20  Recognise and use the + symbol  Order non-concurrent numbers eg: 1, 3, 5, 9</p>	<p><b><u>Fluency required by end of year 1</u></b>  Represent and use number bonds to 5,  Represent and use number bonds to ten  Add using doubles  Add numbers mentally by counting on <math>TU + U</math> or <math>U + U + U</math> (not crossing 10 barrier)  Count forwards, to and across 100, beginning with 0 or 1 or from any given number  Switch count between tens and ones e.g. 10, 20, 30, 31, 32, 33 ...  Represent and use number bonds up to and within 20 (establish addition and subtraction as related operations eg <math>8 + 5 = 13</math>)  Count, read and write numerals to 100  Read and write numbers to 20 in numerals or words  Find one more than a number  Find ten more than a number  Count in multiples of 2s, 5s and 10s starting on multiples to highlight pattern recognition</p>	<p><b><u>Fluency required by end of year 2</u></b>  Represent and use number-bonds to 20  Add numbers mentally by counting on <math>TU + U</math> or <math>U + U + U</math> or <math>TU + TU</math> (crossing 10s barrier)  Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward  Recognise the place value of each digit in a two-digit number (tens, ones)  Identify, represent and estimate numbers using different representations, including the number line  Compare and order numbers from 0 up to 100; use <math>&lt;</math>, <math>&gt;</math> and <math>=</math> signs  Read and write numbers to at least 100 in numerals and in words  Use place value and number facts to solve problems.  Use knowledge to begin to derive and use number facts up to 100 (multiples of 10)</p>

# + Addition + Add, Plus, Parts and wholes, Total, More, Sum, Altogether, 'Is equal to', 'Is the same as'.

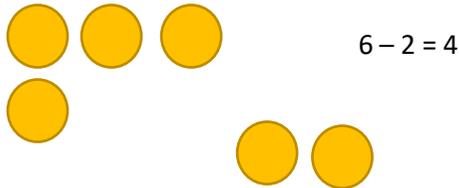
Year 3	Year 4	Year 5	Year 6																											
<p><b>As year 2 plus:</b></p> <p>Understand place value – can partition numbers &amp; recombine numbers to support column addition.</p>  <p>24 + 15 = Add together the ones first then add the tens. Use the Base 10 blocks and place value counters.</p> <p>Expanded addition, TU then TU crossing tens barriers, then HTU (three digits)</p> <p>34 + 62 =</p> $\begin{array}{r} 30 + 4 \\ 60 + 2 \\ \hline 90 + 6 = 96 \end{array}$  <p>146 + 527</p> <p>494 + 368 =</p> $\begin{array}{r} 400 + 90 + 4 \\ 300 + 60 + 8 \\ \hline 700 + 150 + 12 = 862 \end{array}$ <p>Use of different concrete and pictorial representations</p>  <p>Then compact addition (only if pupils are confident)</p> $\begin{array}{r} 536 \\ + 85 \\ \hline 621 \\ 11 \end{array}$	<p><b>As year 3 plus:</b></p> <p>Compact addition with numbers up to four digits.</p>  <p>Children can use concrete apparatus or draw a pictorial representation of the columns and place value counters to further support their learning and understanding.</p> $\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 111 \end{array}$ <p>Expanded addition may be used for decimals in real contexts e.g. money and length.</p> $\begin{array}{r} \pounds 7.89 \\ + \pounds 6.42 \\ \hline \pounds 14.31 \\ 11 \end{array}$ <p>£11.35 + £12.43 =</p> <p>£10 + £1 + 30p + 5p + £10 + £2 + 40p + 3p £20 + £3 + 70p + 8p = £23.78</p> <p>Continue to use different concrete and pictorial representations</p>  $\begin{array}{r} 5568 \\ 3888 \quad 1680 \end{array}$	<p><b>As year 4 plus:</b></p> <p>Compact addition with numbers larger than four digits.</p> <p>Compact addition with decimals to two places (including with different numbers of decimal places.)</p> <p>e.g.</p> $\begin{array}{r} 32.75 \\ + 48.64 \\ \hline 81.39 \\ 11 \end{array}$ $\begin{array}{r} 23.361 \\ 9.080 \\ 59.770 \\ + 1.300 \\ \hline 93.511 \\ 212 \end{array}$  <p>1 0.1 0.01</p> <p>Cuisenaire</p>  <p>Bar Model</p> 	<p><b>As year 5 plus:</b></p> <p>Compact addition involving large numbers.</p> <p>Compact addition with decimals to three places (including mixed amounts of decimal places)</p> <p>e.g.</p> $\begin{array}{r} 32.756 \\ + 48.646 \\ \hline 81.402 \\ 1111 \end{array}$ <p>24.5 + 36.238</p> $\begin{array}{r} 24.500 \\ + 36.238 \\ \hline 60.738 \\ 1 \end{array}$ <table border="1" data-bbox="1736 782 2139 837"> <thead> <tr> <th>0.01</th><th>0.02</th><th>0.03</th><th>0.04</th><th>0.05</th><th>0.06</th><th>0.07</th><th>0.08</th><th>0.09</th> </tr> </thead> <tbody> <tr> <td>0.1</td><td>0.2</td><td>0.3</td><td>0.4</td><td>0.5</td><td>0.6</td><td>0.7</td><td>0.8</td><td>0.9</td> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> </tr> </tbody> </table>	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	2	3	4	5	6	7	8	9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09																						
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9																						
1	2	3	4	5	6	7	8	9																						

<p><b><u>NC Year 3 end of year expectations</u></b>  Add and subtract numbers mentally, including:</p> <ul style="list-style-type: none"> <li>• a three-digit number and ones</li> <li>• a three-digit number and tens</li> <li>• a three-digit number and hundreds</li> </ul> <p>Add and subtract numbers with up to three digits, leading to using formal written methods of columnar addition and subtraction</p> <p>Estimate the answer to a calculation and use inverse operations to check answers</p> <p>Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p> <p>Children should partition numbers, up to 1000, in different ways e.g. <math>100 + 40 + 6</math> or <math>100 + 30 + 16</math></p> <p><b>ENSURE CHILDREN HAVE THE OPPORTUNITY TO ADD MORE THAN TWO NUMBERS WITH DIFFERING NUMBERS OF DIGITS</b></p>	<p><b><u>NC Year 4 end of year expectations</u></b>  Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate</p> <p>Add together numbers with up to two decimal places in the context of money</p> <p>Estimate and use inverse operations to check answers to a calculation</p> <p>Solve addition and subtraction two-step problems in contexts, (including missing number problems) deciding which operations and methods to use and why.</p> <p><b>ENSURE CHILDREN HAVE THE OPPORTUNITY TO ADD MORE THAN TWO NUMBERS, INCLUDING DECIMALS, WITH DIFFERING NUMBERS OF DIGITS</b></p>	<p><b><u>NC Year 5 end of year expectations</u></b>  Add and subtract whole numbers with more than 4 digits, and decimals up to 3 decimal places, including using formal written methods (columnar addition and subtraction)</p> <p>Add and subtract numbers mentally with increasingly large numbers</p> <p>Use rounding and estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.</p> <p><b>N.B. ENSURE CHILDREN HAVE THE OPPORTUNITY TO ADD MORE THAN TWO NUMBERS, INCLUDING DECIMALS, WITH DIFFERING NUMBERS OF DIGITS</b></p>	<p><b><u>NC Year 6 end of year expectations</u></b>  Perform mental calculations, including with mixed operations and large numbers</p> <p>Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why</p> <p>Solve problems involving addition, subtraction, multiplication and division using their knowledge of the order of operations to carry out calculations involving the four operations</p> <p>Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.</p> <p>Add numbers with more than four-digits and decimals up to three places (formal written column method).</p> <p><b>N.B. ENSURE CHILDREN HAVE THE OPPORTUNITY TO ADD MORE THAN TWO NUMBERS, INCLUDING DECIMALS, WITH DIFFERING NUMBERS OF DIGITS</b></p>
<p><b><u>Fluency required by end of Year 3</u></b>  Represent and use number-bonds to 100  Count from 0 in multiples of 4, 8, 50 and 100;  Find 10 or 100 more or less than a given number  Mentally add HTU + ones, HTU + tens, HTU + hundreds  Count in ones, tens and hundreds maintaining fluency through varied and frequent practice  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 in words  Solve number problems and practical problems involving these ideas</p>	<p><b><u>Fluency required by end of Year 4</u></b>  Count in multiples of 6, 7, 9, 25 and 1000  Find 1000 more or less than a given number  Count forwards through zero starting with 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  Add numbers mentally by partitioning (TU + TU)  Use adjusting to add mentally (<math>45 + 19</math>)  Perform mental calculations with two-digit numbers, the answer could exceed 100 and increasingly large numbers  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.</p>	<p><b><u>Fluency required by end of Year 5</u></b>  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  Begin to round decimal numbers to the nearest whole number  Solve number problems and practical problems that involve all of the above  Practise mental calculations with increasingly large numbers  Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.</p>	<p><b><u>Fluency required by end of Year 6</u></b>  Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit  Count in tens and hundreds increasing fluency of order and place value  Round any whole number to a required degree of accuracy  Round decimal numbers to the nearest whole number and to one or two decimal places  Use negative numbers in context, and calculate intervals across zero  Add numbers mentally (HTU+ HTU) or (TH.th + TU.th)  Solve number and practical problems that involve all of the above.  Use number-bond knowledge to derive decimal number-bonds  (<math>0.6 + 0.4 = 1</math>) or (<math>0.63 + 0.37 = 1</math>)</p>

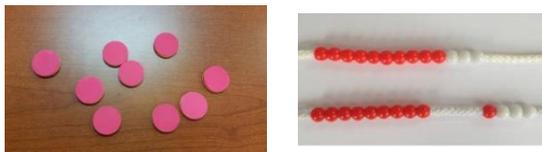
# - Subtraction - Subtract, Take away, Less than, Fewer than, Minus, Difference between, Decrease

Year R

Use physical objects, counters, cubes etc to show how objects can be taken away.

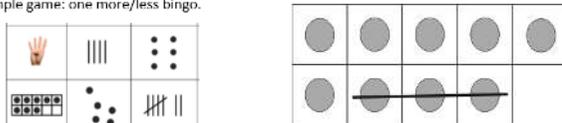


Physically cross out objects on a pictorial representation



Use counters and bead strings, move them away from the group as you take them away counting backwards as you go.

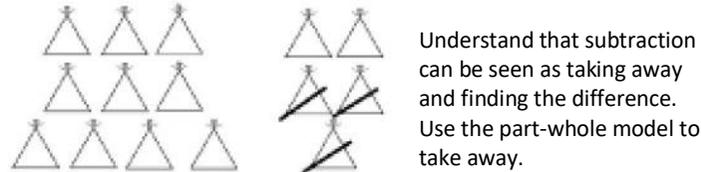
Identify and show one more/less in different ways.  
Example game: one more/less bingo.



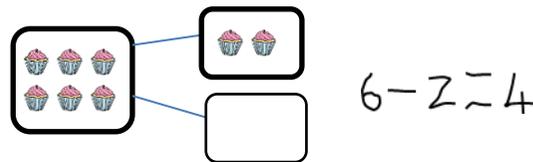
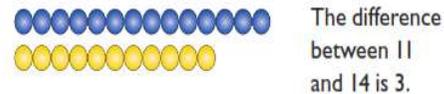
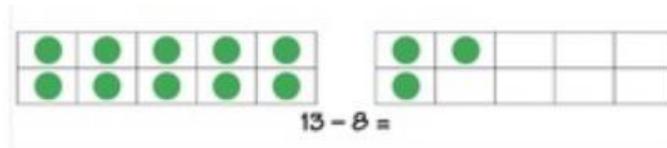
Imagine one less spot

Year 1

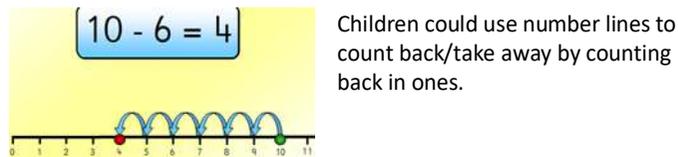
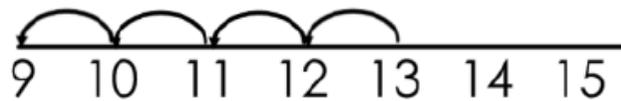
As year R plus:



Understand that subtraction can be seen as taking away and finding the difference. Use the part-whole model to take away.



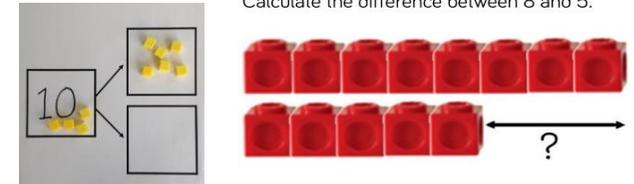
First with concrete apparatus, then number line or 100 square, then mentally. Count back on a number line or number track when secure with concrete apparatus.



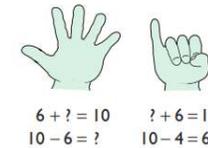
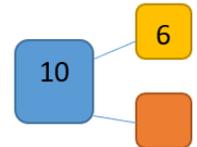
Year 2

As year 1 plus:

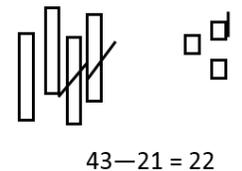
Subtract using concrete objects such as Numicon or base ten. Make the whole and take away the correct amount. Then progress to pictorial representations and mental methods.



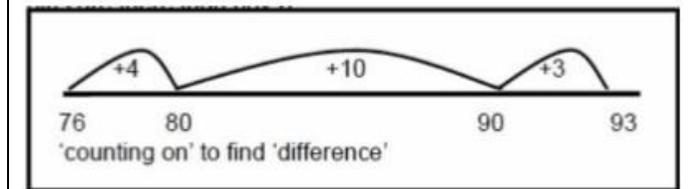
	10	
6		4



Once confident using base ten to subtract children can draw own representations and cross out to show subtraction without regrouping.



Use number lines to complete subtraction calculations. Start at the smaller number with jumps to bigger number (find the difference)



Understand that subtraction is the inverse of addition (Numicon is a particularly useful image) and bar model.

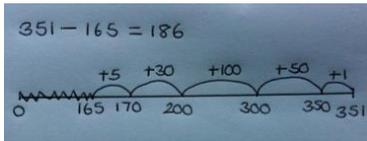
<p><b>EYFS end of year expectations</b></p> <p>Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.</p> <p>Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.</p>	<p><b>NC Yr1 end of year expectations</b></p> <p>Read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs</p> <p>Represent and use number bonds and related subtraction facts within 20</p> <p>Add and subtract one-digit and two-digit numbers to 20, including zero</p> <p>Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = \_\_\_ - 9</math>.</p> <p>Compare quantities to say how many less and/or how many more</p> <p>Understand subtraction as taking away</p> <p>What is ... less than ...?)</p>	<p><b>NC Yr 2 end of year expectations</b></p> <p>Solve problems with addition and subtraction:</p> <ul style="list-style-type: none"> <li>• using concrete objects and pictorial representations, including those involving numbers, quantities, measures, money and real-life contexts</li> <li>• applying their increasing knowledge of mental and written methods</li> </ul> <p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100</p> <p>Subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers, adding three one-digit numbers</p> <p>Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot</p> <p>Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</p> <p>Understand subtraction as taking away and finding the difference</p> <p>Be able to partition numbers in different ways</p>
<p><b>Fluency required by end of Year R</b></p> <p>Count backward in ones from 5 (five little ducks) etc, Count backward in ones from 10.</p> <p>Count backward in ones from any number less than 20.</p> <p>Find one less than a number</p> <p>Read digits up to 20</p> <p>Match written numbers to number of objects</p> <p>Order concurrent numbers up to 20 from largest to smallest</p> <p>Recognise and use the - symbol</p>	<p><b>Fluency required by end of Year 1</b></p> <p>Represent and use number bonds to 5</p> <p>Represent and use number bonds to ten</p> <p>Use number-bonds to ten to derive subtraction facts</p> <p>Count backwards (including crossing 100) any given number</p> <p>Switch count between ones and tens e.g. 33, 32, 31, 30, 20, 10</p> <p>Represent and use number bonds up to 20 (establish addition and subtraction as related operations)</p> <p>Count, read and write numerals to 100</p> <p>Read and write numbers to 20 in numerals or words</p> <p>Find one less than a number</p> <p>Find ten less than a number</p> <p>identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least</p> <p>Count back in multiples of 2s, 5s and 10s starting on multiples to highlight pattern</p>	<p><b>Fluency required by end of Year 2</b></p> <p>Practise addition and subtraction facts to 20</p> <p>Show increasing fluency in deriving subtraction facts for numbers up to 10 and then up to 20</p> <p>Subtract numbers mentally by counting back TU - U or U - U or TU - TU (crossing 10's barrier)</p> <p>Count backward in steps of 2, 3, and 5 from 0, and in tens from any number.</p> <p>Recognise the place value of each digit in a two-digit number (tens, ones)</p> <p>Identify, represent and estimate numbers using different representations, including the number line</p> <p>Compare and order numbers from 0 up to 100; use &lt;, &gt; and = signs</p> <p>Read and write numbers to at least 100 in numerals and in words</p> <p>Use place value and number facts to solve problems.</p> <p>Use known facts to 20 to derive new facts e.g. <math>10 - 7 / 100 - 70</math></p> <p>Use knowledge to derive and use subtraction number facts up to 100 (multiples of 10)</p>

# - Subtraction - Subtract, Take away, Less than, Fewer than, Minus, Difference between, Decrease

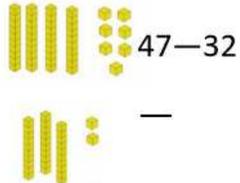
Year 3

As year 2 plus:

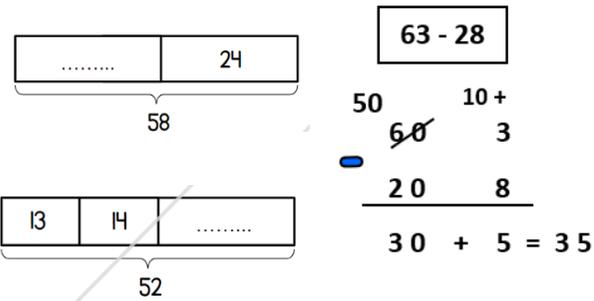
Number line method  
(2 and 3 digit numbers)  
 $351 - 165 = 186$



Expanded column subtraction using concrete objects and pictorial representations, initially without exchanging/regrouping.



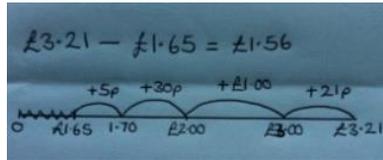
Continue to use concrete apparatus to develop understanding of exchanging/regrouping  
Eg:  $56 - 37$



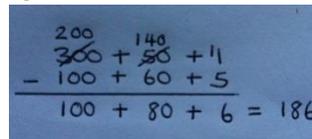
Year 4

As year 3 plus:

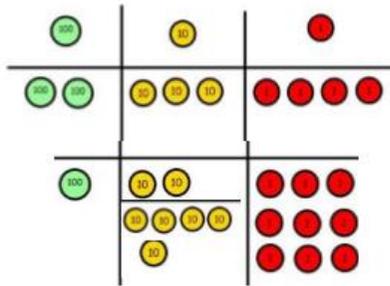
Number line method (Decimals in a real context and time-based problems)



Expanded subtraction  
e.g.  $354 - 165$

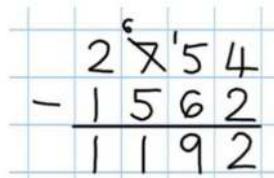


e.g.  $234 - 179$



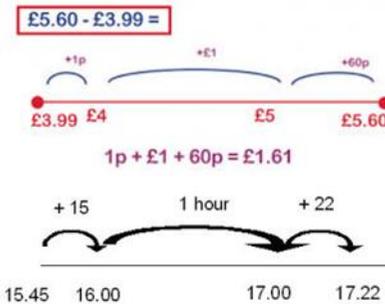
Use base 10 or place value counters alongside the written calculation to help to show working.

Move on to compact subtraction if children are confident



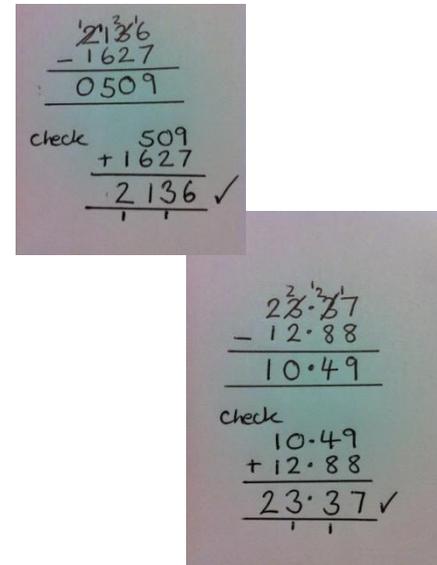
Year 5

As year 4 plus:



Pupils to understand the value of number-line subtraction for contextual problems (time/money/ measures etc)

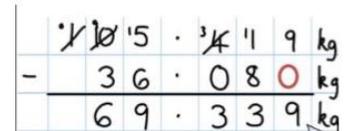
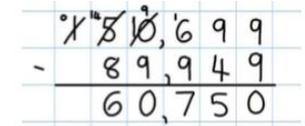
Compact subtraction, involving numbers larger than 4 digits and with decimals to 2 places.



Year 6

As year 5 plus:

Compact subtraction involving large numbers.  
Compact subtraction with decimals up to three places.



<p><b><u>NC Year 3 end of year expectations</u></b>  Subtract numbers mentally, including:</p> <ul style="list-style-type: none"> <li>• a three-digit number and ones</li> <li>• a three-digit number and tens</li> <li>• a three-digit number and hundreds</li> </ul> <p>Children apply, develop and secure their understanding of place value and begin to record in columns  Subtract numbers with up to three digits, leading to using formal written methods of columnar subtraction  Estimate the answer to a calculation and use inverse operations to check answers  Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</p>	<p><b><u>NC Year 4 end of year expectations</u></b>  Subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate  Estimate and use inverse operations to check answers to a calculation  Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and justifying why.  Understand subtraction as the inverse of addition</p>	<p><b><u>NC Year 5 end of year expectations</u></b>  Subtract whole numbers with more than 4 digits and decimals, including using formal written methods (columnar 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 addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. (this may include number lines)</p>	<p><b><u>NC Year 6 end of year expectations</u></b>  Perform mental calculations, including with mixed operations and large numbers  Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why (this could include number lines)  Solve problems involving addition, subtraction, multiplication and division using their knowledge of the order of operations to carry out calculations involving the four operations  Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.  Subtract numbers with more than four-digits and decimals up to three places (formal written column method)  N.B. ENSURE CHILDREN HAVE THE OPPORTUNITY TO SUBTRACT DECIMALS, WITH DIFFERING NUMBERS OF DIGITS</p>
<p><b><u>Fluency required by end of Year 3</u></b>  Count back in ones, tens and hundreds maintaining fluency through varied and frequent practice  Switch count between hundreds, tens and ones e.g 500, 400, 300, 290, 280, 270, 269, 268, 267  Find 10 or 100 less than a given number with up to three digits  Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)  Mentally subtract HTU - ones, HTU - tens, HTU - hundreds  Perform mental calculations with two-digit numbers  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 in words  Solve number problems and practical problems involving these ideas.</p>	<p><b><u>Fluency required by end of Year 4</u></b>  Count back in multiples of 6, 7, 9, 25 and 1000  Find 1000 less than a given number  Count backwards through zero to include negative numbers  Subtract numbers mentally by partitioning (TU - TU)  Use adjusting to subtract mentally (45 - 19)  Continue to practise mental subtraction calculations with increasingly large numbers to aid fluency  Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)  Order (in descending 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</p>	<p><b><u>Fluency required by end of Year 5</u></b>  Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit  Count backwards in steps of powers of 10 for any given number up to 1 000000  Subtract numbers mentally by partitioning (HTU- TU or HTU - HTU)  Use adjusting to subtract mentally (45 - 19)  Interpret negative numbers in context, count 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  Begin to round decimal numbers to the nearest whole number  Practise mental calculations with increasingly large numbers  Solve number problems and practical problems that involve all of the above</p>	<p><b><u>Fluency required by end of Year 6</u></b>  Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit  Count back in tens and hundreds increasing fluency of order and place value  Round any whole number to a required degree of accuracy  Round decimal numbers to the nearest whole number and to one or two decimal places  Use negative numbers in context, and calculate intervals across zero  Subtract numbers mentally (HTU - HTU) or (TH.th - TU.th)  Solve number and practical problems that involve all of the above.  Use number-bond knowledge to derive decimal number-bonds  (1 - 0.4 = 0.6) or (1 - 0.37 = 0.63)</p>

# x Multiplication x Multiply, Times, Lots of, Groups of, Multiple of, Multiplied by, Product, Equal groups

Year R

Introduce language and concept of making equal groups.  
Begin to double numbers to 5. Use concrete apparatus to show how to double a number.

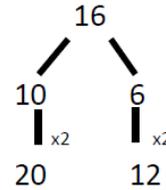
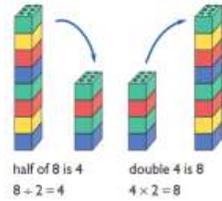
Double 4 is 8



Year 1

As year R plus:

Recall doubles to 10. Use this knowledge to support halving and doubling larger numbers.



Understand multiplication as repeated addition.



$$5 + 5 + 5 + 5 + 5 + 5 = 30$$

$$5 \times 6 = 30$$

5 multiplied by 6

6 groups of 5

6 hops of 5

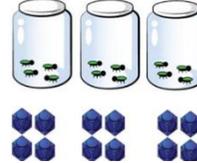


$$2 + 2 + 2 + 2 + 2 = 10$$

$$3 \times 4$$

$$4 + 4 + 4$$

There are 3 equal groups, with 4 in each group.



Group sets of objects reliably in 2s, 5s and 10s.

Recognise number sequences e.g. 2s, 5s and 10s. Use of arrays.

$$4 \times 2 = 8$$



$$2 \times 4 = 8$$



Use manipulatives to create equal groups.

Year 2

As Year 1 plus:

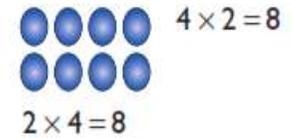
By the end of the year pupils should recall all multiplication facts for the 2, 5 and 10 times tables.

Understand multiplication as scaling.



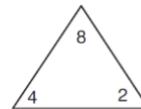
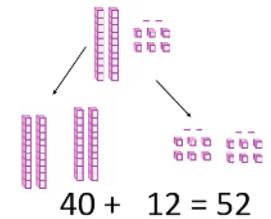
The giant is twice as big as a boy.

Understand that multiplication is commutative (arrays eg. Numicon and Cuisenaire particularly useful).



Use of manipulatives to help double and multiply

Counting in multiples of 2, 3, 4, 5, 10



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

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

$$\square \div \square = \square$$

$$\square \div \square = \square$$

Understand that multiplication and division are the inverse of each other.

$$4 \times 10 = 40 \quad 10 \times 4 = 40$$

$$40 \div 4 = 10 \quad 40 \div 10 = 4$$

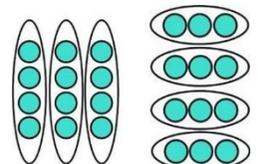
Understand that multiplication is commutative

$$3 \times 4 = 12$$

$$4 \times 3 = 12$$

$$4 + 4 + 4 = 12$$

$$3 + 3 + 3 + 3 = 12$$



<p><b>EYFS end of year expectations</b></p> <p>Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.</p> <p>Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.</p> <p>They solve problems, including doubling, halving and sharing.</p>	<p><b>NC Yr1 end of year expectations</b></p> <p>Solve single step practical problems involving multiplication and division</p> <p>Use concrete objects, pictorial representations and arrays to explore grouping</p> <p>Make connections between arrays, number patterns and counting in twos, fives and tens</p> <p>Double numbers and quantities</p> <p>Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities</p> <p>Understand multiplication as repeated addition</p>	<p><b>NC Yr 2 end of year expectations</b></p> <p>Understand multiplication as repeated addition</p> <p>Calculate mathematical statements for multiplication and division within the tables and write them using symbols (<math>\times</math>), (<math>\div</math>) (=)</p> <p>Pupils use a variety of language to describe multiplication and division.</p> <p>Understand and solve problems involving arrays</p> <p>Understand and solve problems in contexts using arrays, physical objects, repeated addition or multiplication facts to solve</p> <p>Ensure children understand that multiplication is commutative (can be done in any order)</p> <p>Begin to understand that multiplication and division are inverse operations</p>
<p><b>Fluency required by end of Year R</b></p> <p>Count backward in ones from 5 (five little ducks) etc, Count backward in ones from 10.</p> <p>Count backward in ones from any number less than 20.</p> <p>Find one less than a number</p> <p>Read digits up to 20</p> <p>Match written numbers to number of objects</p> <p>Order concurrent numbers up to 20 from largest to smallest</p> <p>Recognise and use the + symbol</p> <p>Use objects to count in twos and fives</p> <p>Use objects to help double and halve</p>	<p><b>Fluency required by end of Year 1</b></p> <p>Count back in multiples of 2s, 5s and 10s starting on multiples to highlight pattern e.g. 6, 8, 10, 12 etc</p> <p>Emphasise number patterns</p> <p>Double numbers and quantities</p> <p>Add using doubles</p> <p>Switch count between tens and ones e.g. 10, 20, 30, 31, 32, 33 ...</p>	<p><b>Fluency required by end of Year 2</b></p> <p>Count in twos, threes, fives from zero and tens from any number forward and begin to do it backwards e.g. 6, 8, 10, 12 etc</p> <p>Emphasise number patterns</p> <p>Introduction to multiplication tables.</p> <p>Practise to become fluent in multiplication facts for 2, 5 and 10</p> <p>Solve multiplication problems mentally using arrays, contexts and materials to help them,</p> <p>Begin to use know multiplication facts to help them to find new facts, including related division facts</p> <p>Connect 10 times table to place value. Connect 5 times table to divisions on clock face</p> <p>Pupils use a variety of language to describe multiplication and division.</p>

# x Multiplication x Multiply, Times, Lots of, Groups of, Multiple of, Multiplied by, Product, Equal groups

## Year 3

**As year 2 plus:**

Focus on understanding, representing and remembering times tables facts for 2,5,10,3,4 and 8 times tables, including division facts



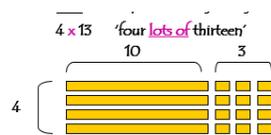
$$4 \times 8 = 32$$

$$8 \times 4 = 32$$

$$32 \div 4 = 8$$

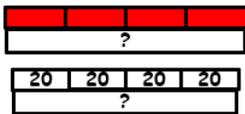
$$32 \div 8 = 4$$

Children SHOULD use manipulatives alongside algorithms.



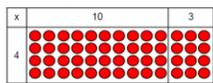
Expanded methods - grid and partitioning

x	10	3
4	40	12
40 + 12 = 52		



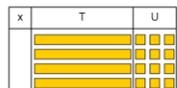
bar models

Show the link with arrays to first introduce the grid method.



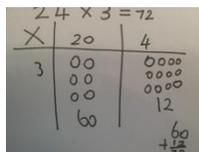
4 rows of 10  
4 rows of 3

Move on to using Base 10 to move towards a more compact method.



4 rows of 13

*Introduce grid method of multiplication using manipulatives including place value counters*



## Year 4

**As year 3 plus:**

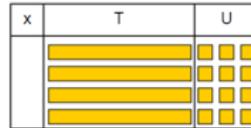
**ALL times tables facts to 12 x 12 should be known by end of year 4 including multiplying by 0 and 1.** Children should learn to multiply three numbers together and that these could be multiplied in ANY order.

$$4 \times 6 \times 3 =$$

$$4 \times 6 = 24 \times 3 = 72$$

Grid method TU x U or HTU X U

Show the link with arrays to first introduce the grid method.

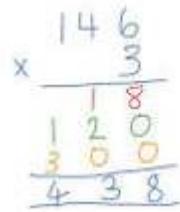


e.g. 4 x 13

Example of grid method: 245 x 6

x	200	40	5	Total
6	1200	240	30	1470

Moving forward, multiply 2 digit by 2 digit number showing the different rows within the grid method. Continue to use manipulatives to support.



$$\begin{array}{r} 146 \\ \times 3 \\ \hline 438 \end{array}$$

Many children will move onto the ladder method and/or short column method multiplication. This uses knowledge of place value to help with multiplying by multiples of 10/100.

## Year 5

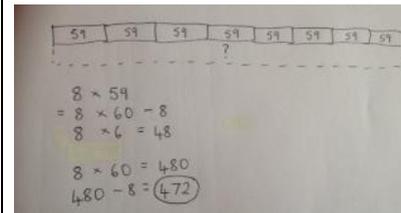
**As year 4 plus:**

Multiply with numbers up to 4 digits. Grid Method for TU x TU, HTU x TU, THTU x TU or U.

e.g. 35 x 46

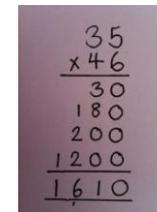
x	30	5	Total
40	1200	200	1400
6	180	30	210
Total			1610

Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written method.



Long Multiplication (expanded method)

$$\begin{array}{r} 32 \\ \times 24 \\ \hline 64 \\ 640 \\ \hline 768 \end{array}$$

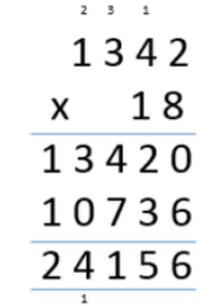
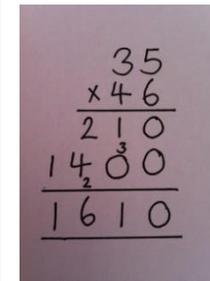


If it helps, children can write out what they are solving next to their answer. Note -some children may continue to use the grid method

## Year 6

**As year 5 plus:**

**Long Multiplication**  
Up to 4 digit x 2 digit



$$\begin{array}{r} 3.24 \\ \times 26 \\ \hline 19.44 \end{array}$$

$$\begin{array}{r} 64.80 \\ \times 12 \\ \hline 84.24 \end{array}$$

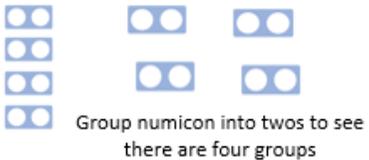
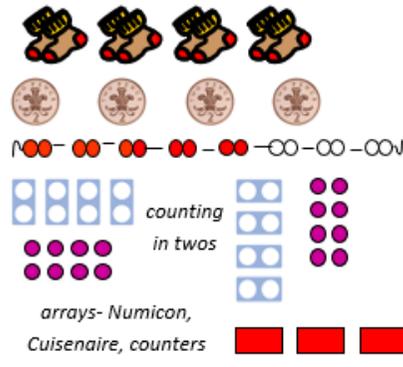
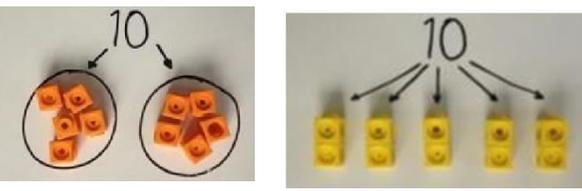
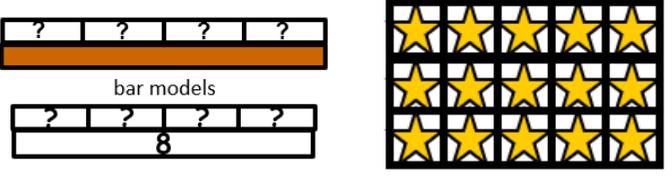
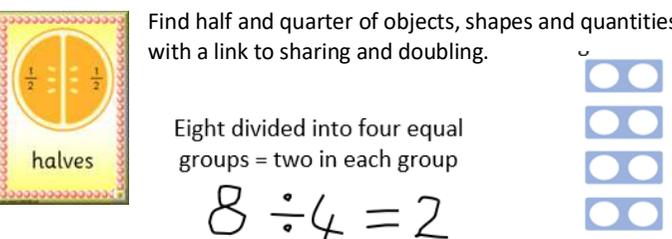
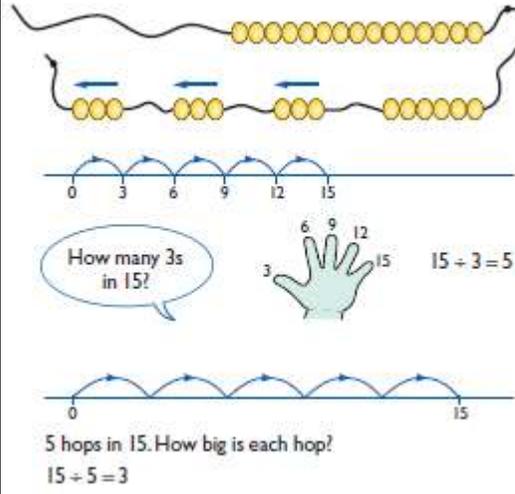
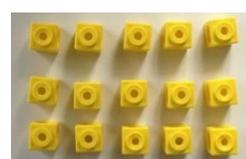
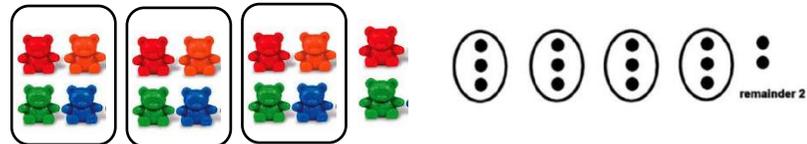
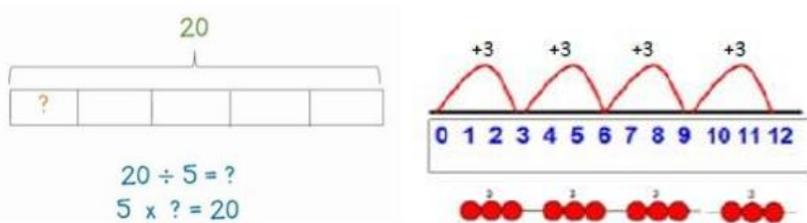
$$\begin{array}{r} 19.44 \\ \times 11 \\ \hline 213.84 \end{array}$$

Moving to... Decimal numbers to 2 places multiplied by whole numbers

See multiplication appendix 4 arrays- showing commutative multiplication. Appendix 5 grid method. Appendix 6 column multiplication.

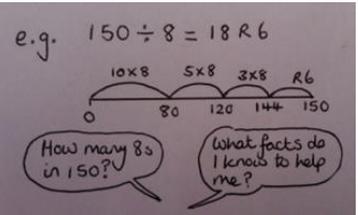
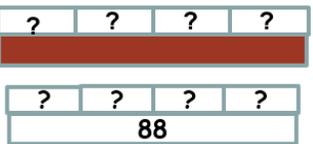
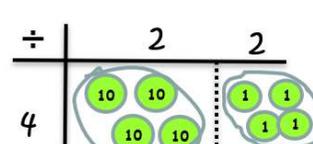
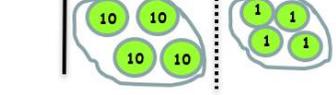
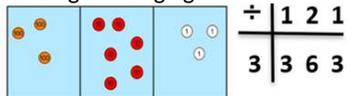
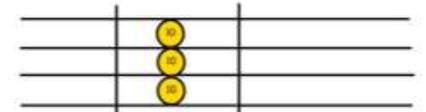
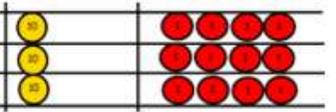
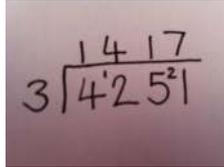
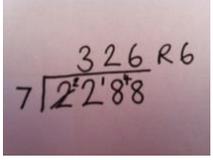
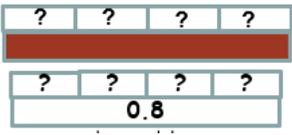
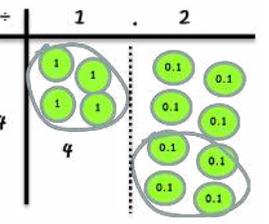
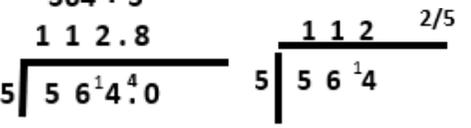
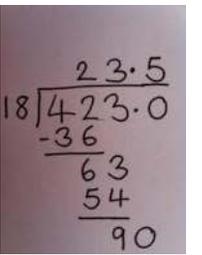
<p><b><u>NC Year 3 end of year expectations</u></b>  Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers  Use mental methods including partitioning, progressing to reliable (more formal) written methods  Pupils develop reliable written methods for multiplication, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication. Understand and solve problems in context including, missing number problems, measuring and scaling problems  Solve problems involving multiplication including correspondence in which n objects is connected to m objects</p>	<p><b><u>NC Year 4 end of year expectations</u></b>  Multiplying three numbers together eg <math>2 \times 3 \times 4</math> – associative law <math>-(2 \times 3) \times 4 = 2 \times (3 \times 4)</math>  Multiplying by 0 and by 1  Use mental methods including partitioning, ladder and grid method progressing to reliable (more formal) written methods  For those who are confident, develop fluency in short multiplication using formal written layout (2 and 3 digit numbers by a 1 digit number).  Solve problems involving multiplication including using the distributive law to multiply a 2 digit number by a 1 digit number (<math>24 \times 7 = 20 \times 7 + 4 \times 7</math>), integer scaling problems (I am two times bigger/I am five times bigger) and harder correspondence problems such as n objects are connected to m objects  Solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children</p>	<p><b><u>NC Year 5 end of year expectations</u></b>  Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers  Identify multiples and factors including finding all factor pairs of a number, and common factors of two numbers  Solve problems involving all four operations where larger numbers are used, using knowledge of multiples, factors, squares and cubes.  Multiply whole numbers and those involving decimals by 10, 100 &amp; 1000  Understand and use multiplication and division as inverses including in problems involving missing numbers and balancing equations  Solve problems involving multiplication and division including scaling by simple fractions  Know and use the vocabulary of prime numbers, prime factors and composite (non-prime), recall prime numbers to 19 and work out if any number up to 100 is prime  Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)  Multiply decimals with up to three decimal places by a one digit number</p>	<p><b><u>NC Year 6 end of year expectations</u></b>  Multiply numbers up to 4-digit x TU using formal methods of short and long multiplication  Multiply numbers with up to two decimal places x whole number  Solve contextual problems involving all four operations, deciding which operations and methods to use and why  Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.  Identify common factors, common multiples and prime numbers  Use their knowledge of the order of operations to carry out calculations involving the four operations  Use common factors to simplify fractions; use common multiples to express fractions in the same denomination  Multiply simple pairs of proper fractions, writing the answer in its simplest form  [for example, <math>\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}</math>]</p>
<p><b><u>Fluency required by end of Year 3</u></b>  Count from 0 in multiples of 4, 8, 50 and 100  Practise, Recall and use multiplication table facts for the 3, 4 and 8 times tables  Use multiples of 2, 3, 4, 5, 8, 10, 50 and 100  Connect the 2, 4 and 8 times tables using doubling  Develop efficient mental methods using commutativity and multiplication facts to derive related facts e.g. <math>4 \times 4 \times 12 = 12 \times 4 \times 5 = 12 \times 20</math>  Pupils continue to count in ones, tens and hundreds  Multiply and divide whole numbers by ten and hundred (not decimals)  Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10  Multiply by 20 by <math>\times 2</math> and <math>\times 10</math>, understand that this works as 20 is two lots of ten</p>	<p><b><u>Fluency required by end of Year 4</u></b>  Count in multiples of 6,7, 9, 25 and 1000  Recall and use multiplication facts and related division facts up to <math>12 \times 12</math> with fluency  Derive multiplication facts with up to three-digits (for example <math>600 \div 3 = 200</math> can be derived from <math>2 \times 3 = 6</math>).  Recognise and use factor pairs and commutativity in mental calculations  Use the distributive law (multiplying a number by a group of numbers added together is the same as doing each multiplication separately  Eg: <math>3 \times (2 + 4) = 3 \times 2 + 3 \times 4</math>)  Combine knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. <math>2 \times 6 \times 5 = 10 \times 6</math>  Multiply and divide whole numbers by ten and a hundred (including decimals)  Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.</p>	<p><b><u>Fluency required by end of Year 5</u></b>  Count forwards in steps of powers of 10 from any given number up to 1 000 000  Apply all multiplication tables frequently. Commit them to memory and use them confidently to make larger calculations  Multiply numbers mentally drawing upon known facts  Practise and develop knowledge of factors, multiples, square numbers and prime numbers  Multiply whole numbers and those involving decimals by 10, 100 &amp; 1000  Continue to use number in context, including measurement.  Extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far.  Recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule.</p>	<p><b><u>Fluency required by end of Year 6</u></b>  Undertake mental calculations with increasingly large numbers and more complex calculations  Continue to use all multiplication tables to calculate mathematical statements in order to maintain fluency  Practise and develop knowledge of factors, multiples, square numbers and prime numbers  Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places  Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.  Pupils explore the order of operations using brackets;  for example, <math>2 + 1 \times 3 = 5</math> and <math>(2 + 1) \times 3 = 9</math>.</p>

# ÷ Division ÷ Share equally, Group equally, Divide, Remainder, Factor, Quotient, Divided by

<b>Year R</b> Method to be used by core of class	<b>Year 1</b> Method to be used by core of class	<b>Year 2</b> Method to be used by core of class
<p>Introduce language and concept of sharing fairly and making equal groups.</p> <p>Practical only e.g. link to small world Using concrete objects, pictorial representations and arrays with the support of an adult – take photographs/draw pictures – if using Numicon small icons could be stuck in</p>  <p>Group numicon into twos to see there are four groups</p> <p>Link halving to doubling by counting in twos.</p>  <p>arrays- Numicon, Cuisenaire, counters</p>	<p>Understand division as sharing equally into groups. Share into groups using concrete apparatus then move to pictorial representations.</p>  <p>Explore division as both sharing and grouping. Eg <math>12 \div 3</math> could be 12 shared by 3, so 3 people get 4 each. Or 12 grouped into 3's so 4 groups of 3.</p> <p>Ensure that pupils use manipulatives to support with understanding.</p>  <p>Use flexible arrays and bar models to explore the link between multiplication and division</p>  <p>Find half and quarter of objects, shapes and quantities with a link to sharing and doubling.</p>  <p>Eight divided into four equal groups = two in each group</p> $8 \div 4 = 2$	<p><b>As Year 1 plus:</b> By the end of the year pupils should recall all division facts for the 2, 5 and 10 times tables.</p>  <p>Continue exploring division as both sharing and grouping.</p> <p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p> <p>Eg <math>15 \div 3 = 5</math>   <math>5 \times 3 = 15</math>  <math>15 \div 5 = 3</math>   <math>3 \times 5 = 15</math></p>  <p>Finding remainders: Divide objects between groups and see how much is left over <math>14 \div 3 =</math></p>  <p>Use bar models and number lines to explore division.</p>  <p><math>20 \div 5 = ?</math>  <math>5 \times ? = 20</math></p>

<p><b><u>EYFS end of year expectations</u></b>  Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.  Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.  They solve problems, including doubling, halving and sharing.</p>	<p><b><u>NC Yr1 end of year expectations</u></b>  Solve single step practical problems involving multiplication and division  Use concrete objects, pictorial representations and arrays  Understand division as grouping and sharing  Use language of 'sharing equally between'  Make connections between arrays, number patterns and counting in twos, fives and tens  Recognise, find and name a half as one of two equal parts of an object, shape or quantity  Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.  Connect halves and quarters to equal sharing and quantities of sets  Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling and halving numbers and quantities</p>	<p><b><u>NC Yr 2 end of year expectations</u></b>  Understand division as grouping or sharing  Calculate mathematical statements for multiplication and division within the tables and write them using symbols (<math>\times</math>), (<math>\div</math>) (=)  Pupils use a variety of language to describe multiplication and division.  Understand and solve single steps practical problems involving division  Understand and solve problems in contexts using arrays, concrete objects or pictorial representations to solve  Ensure children understand that multiplication is commutative but division is not  Begin to understand that multiplication and division are inverse operations and relate this to fractions and measures  Recognise, find, name and write fractions <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math> of a length, shape, set of objects or quantity  Write simple fractions for example, <math>\frac{2}{6}</math>  1 of 6 = <math>\frac{1}{6}</math> and recognise the equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math>.</p>
<p><b><u>Fluency required by end of Year R</u></b>  Count backward in ones from 5 (five little ducks) etc,  Count backward in ones from 10.  Count backward in ones from any number less than 20.  Find one less than a number  Read digits up to 20  Match written numbers to number of objects  Order concurrent numbers up to 20 from largest to smallest  Recognise and use the + symbol  Use objects to count in twos and fives  Use objects to help double and halve</p>	<p><b><u>Fluency required by end of Year 1</u></b>  Count back in multiples of 2s, 5s and 10s starting on multiples to highlight pattern e.g. 6, 8, 10, 12 etc  Emphasise number patterns  Find simple fractions eg half and quarter, of objects, numbers and quantities  Read and write numbers from 1 to 20 in numerals and words.</p>	<p><b><u>Fluency required by end of Year 2</u></b>  Count backwards in twos, threes, fives from zero and tens e.g. 12, 10, 8, 6 etc  Emphasise number patterns  Introduction to multiplication tables.  Practise to become fluent in multiplication facts for 2, 5 and 10  Begin to use know multiplication facts to help them to find new facts, including related division facts  Solve division problems involving grouping and sharing  Connect 10 times table to place value. Connect 5 times table to divisions on clock face  Pupils use a variety of language to describe multiplication and division.  Find halves and quarters</p>

# ÷ Division ÷ Share equally, Group equally, Divide, Remainder, Factor, Quotient, Divided by

Year 3 Agreed method to be used by core of class	Year 4 Agreed method to be used by core of class	Year 5 Agreed method to be used by core of class	Year 6 Agreed method to be used by core of class
<p><b>As year 2 plus:</b> Focus on understanding, representing and remembering times tables facts for 2,5,10,3,4 and 8 times tables, including division facts.</p>  <p>e.g.  <math>4 \times 8 = 32</math>  <math>8 \times 4 = 32</math>  <math>32 \div 4 = 8</math>  <math>32 \div 8 = 4</math></p> <p>It is especially important that children understand that division can be grouping or sharing.</p>  <p>Use bar models or number lines to explore division with known facts</p>  <p>facts</p>  <p>88</p>  <p>For those who have a sound understanding of division, an introduction to bus stop method using place value counters. Use numbers that do not need exchanging or remainders.</p>	<p><b>As year 3 plus:</b> Focus on understanding, representing and remembering times tables facts for ALL times tables up to 12 x12 including division facts. Continue to use mental strategies and none facts to shown division using bar models and number lines. Begin to use bus stop method alongside place value counters, including calculations needing exchanging.</p>  <p><math>363 \div 3</math></p> <p>Use place value counters to divide using the bus stop method alongside</p>   <p>Calculations <math>42 \div 3 =</math></p> <p><math>42 \div 3 =</math> Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.</p>   <p>We exchange this ten for ten ones and then share the ones equally among the groups.</p>  <p>We look how much in 1 group so the answer is 14.</p>	<p><b>As year 4 plus:</b> Short division, up to 4 digit numbers divided by 1 digit numbers e.g <math>4251 \div 3</math></p>  <p>Including dealing with remainders in context and as a decimal answer.</p>  <p><math>564 \div 5</math> 1 1 2 . 8</p>  <p>Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.</p> <p>Use of place value counters to support with short division and also division of decimals.</p>  <p>Continue to use bar models to explore what division looks like.</p>	<p><b>As year 5 plus:</b> <u>Short division</u>, up to 4 digit numbers divided by 1 or 2 digit numbers (dependent on value). Children should consider best way to answer/show remainder dependent on context.</p> <p><math>564 \div 5</math></p>  <p><u>Long division</u> Children should become confident with long division methods – encouraging them to write multiples down the side of the page.</p>  <p>Links between division and fractions, decimals, percentages and ratio should be taught and developed throughout the year.</p>

<p><b><u>NC Year 3 end of year expectations</u></b>  Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers  Use mental methods including numberlines and bar models before progressing to reliable (more formal) written methods  Pupils begin to develop reliable written methods for division, starting with calculations of two-digit numbers by one-digit numbers with no remainders.  Understand and solve problems in context including, missing number problems, measuring and scaling problems  Recognise, find and name <math>\frac{1}{2}</math> and <math>\frac{1}{4}</math> of an object, shape or quantity  Understand the link between unit fractions and division  Connect <math>\frac{1}{10}</math> to division by 10  Count in tenths</p>	<p><b><u>NC Year 4 end of year expectations</u></b>  Use mental methods including numberlines and bar models progressing to reliable (more formal) written methods.  Become fluent in the formal written method of short division with exact answers when dividing by a one-digit number  Divide one- or two-digit numbers by 10 or 100, identifying value of digits as tenths or hundredths  Solve problems involving division including integer scaling problems (I am two times smaller/I am five times smaller)  Pupils understand the relation between fractions and multiplication and division of quantities, Recognise and show, using diagrams, families of common equivalent fractions and understand link to multiplication and division</p>	<p><b><u>NC Year 5 end of year expectations</u></b>  Practise and extend the formal written method of short division: numbers up to four-digits by a one-digit number  Interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding as appropriate for the context  Identify multiples and factors including finding all factor pairs of a number, and common factors of two numbers  Solve problems involving all four operations where larger numbers are used, using knowledge of multiples, factors, squares and cubes.  Understand and use multiplication and division as inverses including in problems involving missing numbers and balancing equations  Solve problems involving multiplication and division including scaling by simple fractions  Know and use the vocabulary of prime numbers, prime factors and composite (non-prime), recall prime numbers to 19 and work out if any number up to 100 is prime  recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)  Divide whole and decimal numbers by 10,100 and 1000  Use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres</p>	<p><b><u>NC Year 6 end of year expectations</u></b>  Divide numbers up to 4-digit by a 2 digit using formal methods of short and long division interpret remainders as whole numbers, fractions or by rounding, as appropriate for the context  Divide numbers with up to 2 decimal places by 1-digit and 2-digit whole numbers, initially in practical contexts involving money and measures  Understand the relationship between unit fractions and division  Solve contextual problems involving all four operations, deciding which operations and methods to use and why  Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy  Identify common factors, common multiples and prime numbers  Use their knowledge of the order of operations to carry out calculations involving the four operations  Use common factors to simplify fractions; use common multiples to express fractions in the same denomination  Divide proper fractions by whole numbers [for example, <math>\frac{1}{3} \div 2 = \frac{1}{6}</math>]  Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, <math>\frac{3}{8}</math>]</p>
<p><b><u>Fluency required by end of Year 3</u></b>  Count from 0 in multiples of 4, 8, 50 and 100 and backwards  Practise, recall and use multiplication and division facts for the 3, 4 and 8 times tables  Use multiples of 2, 3, 4, 5, 8, 10, 50 and 100  Connect the 2, 4 and 8 times tables using doubling  Develop efficient mental methods using commutativity and multiplication and division facts to derive related facts e.g. <math>30 \times 2 = 60</math>, <math>60 \div 3 = 20</math> and <math>20 = 60 \div 3</math>  Write and calculate mathematical statements for division using what is known  Use division facts to derive related division facts e.g. using <math>6 \div 3 = 2</math> to work out <math>60 \div 3 = 20</math>  Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10</p>	<p><b><u>Fluency required by end of Year 4</u></b>  Count in multiples of 6, 7, 9, 25 and 1000  Recall and use multiplication facts and related division facts up to <math>12 \times 12</math> with increasing fluency  Derive multiplication facts with up to three-digits (for example <math>600 \div 3 = 200</math> can be derived from <math>2 \times 3 = 6</math>).  Recognise and use factor pairs and commutativity in mental calculations  Use place value, known and derived facts to divide mentally, including dividing by 1  Use the distributive law (multiplying a number by a group of numbers added together is the same as doing each multiplication separately)  Eg: <math>3 \times (2 + 4) = 3 \times 2 + 3 \times 4</math>  Combine knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. <math>2 \times 6 \times 5 = 10 \times 6</math>  Multiply and divide whole numbers by ten and a hundred (including decimals)  Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten</p>	<p><b><u>Fluency required by end of Year 5</u></b>  Count backwards in steps of powers of 10 from any given number up to 1 000 000  Apply all multiplication tables frequently. Commit them to memory and use them confidently to make larger calculations  Count backwards with positive and negative whole numbers through zero  Practise and develop knowledge of factors, multiples, square numbers, cube numbers and prime numbers  Multiply and divide numbers mentally drawing upon known facts  Multiply and divide whole numbers and those involving decimals by 10, 100 &amp; 1000  Continue to use number in context, including measurement.  Extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far.  Recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule.</p>	<p><b><u>Fluency required by end of Year 6</u></b>  Undertake mental calculations with increasingly large numbers and more complex calculations  Continue to use all multiplication tables and division facts to calculate mathematical statements in order to maintain fluency  Practise and develop knowledge of factors, multiples, square numbers and prime numbers  Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places  Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.  Pupils explore the order of operations using brackets; for example, <math>2 + 1 \times 3 = 5</math> and <math>(2 + 1) \times 3 = 9</math>.  Perform mental calculations, including with mixed operations and larger numbers</p>

