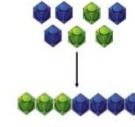
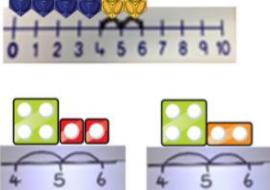
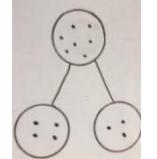
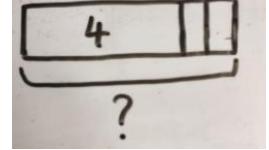
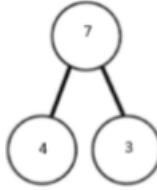


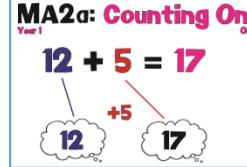
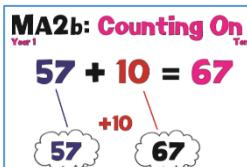
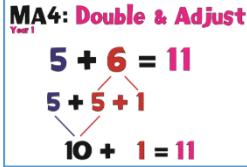
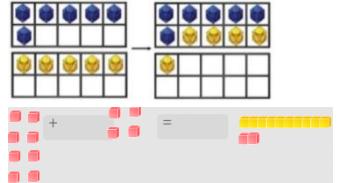
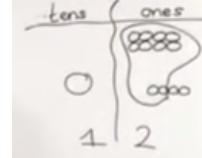
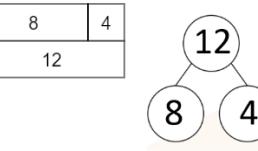
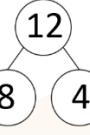
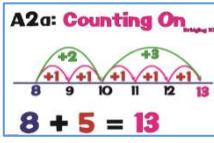
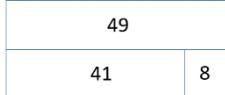
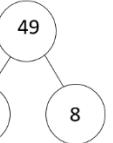
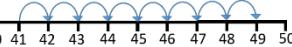


Progression in Calculations - Addition

Links to access online manipulative resources

<https://whiterosemaths.com/resources/classroom-resources/interactive-whiteboard-resources/>
<http://www.ictgames.com/mobilePage/tenFrame/index.html>
<https://www.ictgames.com/mobilePage/partPartWhole/index.html>
<https://www.abcyah.com/games/addition>
<https://www.topmarks.co.uk/mathsgames/hit-the-button>
<https://www.coolmath4kids.com/manipulatives/ten-frame>
<https://www.topmarks.co.uk/addition/addition-to-10>
<https://www.topmarks.co.uk/addition/robot-addition>
<https://www.starfall.com/h/addsub/addsub-ladder/?sn=math1--math0>
<https://www.topmarks.co.uk/mathsgames/mental-maths-train>

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
EYFS	<p>If available, Numicon shapes are introduced straight away and can be used to:</p> <p>Identify 1 more/less</p> <p>Combine pieces to add</p> <p>Find number bonds</p> <p>Add without counting</p>	 <p>Combining two parts to make a whole (use other resources too e.g. eggs, shells, teddy bears, cars).</p>  <p>Counting on using number lines using cubes or Numicon.</p> 	<p>Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.</p>  <p>A bar model which encourages the children to count on, rather than count all.</p> 	$4 + 3 = 7$ <p>Four is a part, 3 is a part and the whole is seven.</p>  <p>The abstract number line: What is 2 more than 4? What is the sum of 2 and 4? What is the total of 4 and 2? $4 + 2$</p> 	<p>Add More And Make Sum Total Altogether Score Double One more, two more, ten more</p> <p>How many more to make?</p> <p>How many more is ... than ...?</p>	<p>100 square Number lines Number tracks Bead strings (for children) Bead bar Tens Frame Numicon Place Value Disks Cuisenaire Base tens and ones</p>

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 1	<p>Add a pair of single-digit numbers, including crossing 10, e.g. $5 + 8$</p> <p>Add one-digit number to a teens number, e.g. $13 + 5$</p> <p>Add one-digit to 10, and a multiple of 10 to a one-digit number, e.g. $10 + 7$, $7 + 30$</p> <p>Add one-digit and two-digit numbers to 20 ($9 + 9$, $18 - 9$), including zero</p> <p>Add near doubles, e.g. $6 + 7$</p> <p>Represent and use number bonds to 20 (&2,3,4,5,6,7,8,9,11,12,13,14,15,16,17,18,19)</p>	<p>MA2a: Counting On $12 + 5 = 17$</p>  <p>MA2b: Counting On $57 + 10 = 67$</p>  <p>MA4: Double & Adjust $5 + 6 = 11$ $5 + 5 + 1 = 11$ $10 + 1 = 11$</p>  <p>TO + O not crossing 10s Using base 10. Continue to develop understanding of partitioning and place value. $41 + 8$</p> 	<p>Regrouping to make 10 using ten frames and counters/cubes or using Numicon. $6 + 5$</p>   <p>Regrouping to make 10 Children to draw the ten frame and counters/cubes.</p> <p>Also draw counters in place value frames</p>  <p>Regrouping to make 10 Children to develop an understanding of equality $6 + \square = 11$ $6 + 5 = 5 + \square$ $6 + 5 = \square + 4$ Use a bar model</p>   <p>A2a: Counting On $8 + 5 = 13$</p> 	<p>Regrouping to make 10 Children to draw the ten frame and counters/cubes.</p> <p>Also draw counters in place value frames</p> <p>TO + O not crossing 10s Using base 10. Continue to develop understanding of partitioning and place value. $41 + 8$</p> <p>TO + O not crossing 10s Use a part whole model $41 + 8 = 49$</p>   	<p>Add</p> <p>Total</p> <p>More</p> <p>Tens</p> <p>Ones</p> <p>Digit</p>	<p>100 square</p> <p>Number lines</p> <p>Number tracks</p> <p>Bead strings (for children)</p> <p>Bead bar</p> <p>Tens Frame</p> <p>Numicon</p> <p>Place Value Disks</p> <p>Cuisenaire</p> <p>Base tens and ones</p>

Solve simple one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems. Explain methods & reasoning

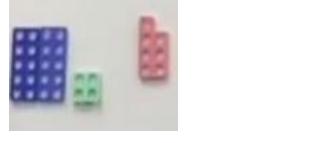
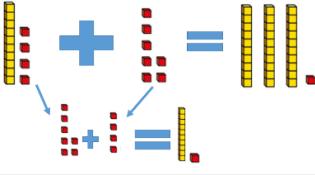
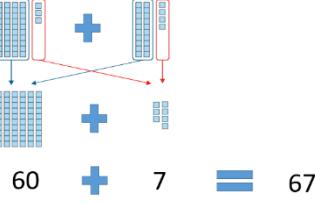
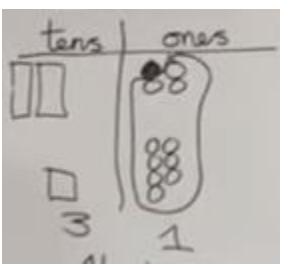
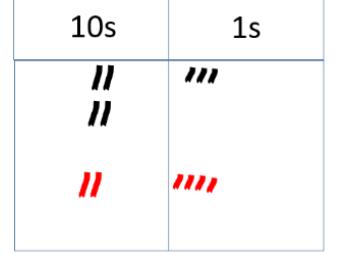
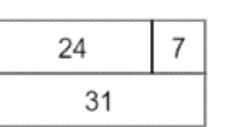
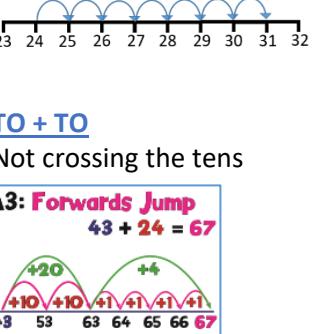
Use the 100 square to add 10 to a single digit number

Record addition by:

- showing jumps on prepared number lines
- recording number sentences

$$\text{E.g. } 6 + 5 = 11$$

Read, write and interpret mathematical statements involving addition (+) and equals (=) signs

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 2	<p>Add numbers using concrete objects, pictorial representations, and mentally, including:</p> <p>add a single-digit number to a two-digit number, including crossing the tens boundary, e.g. 23 + 5, then 28 + 5</p> <p>MA2a: Counting On Year 2 $78 + 7 = 85$ 78 + 7 = 85</p> <p>MA2b: Counting On Year 2 $58 + 40 = 98$ 58 + 40 = 98</p> <p>add a multiple of 10 to any two-digit number, e.g. 27 + 60 add two two-digit numbers</p> <p>adding three one-digit numbers</p> <p>MA3: Number Bonds Year 2 $3 + 4 + 7 = 14$ 3 + 4 + 7 = 14</p> <p>add 9, 19, 29, ... or 11, 21, 31, ...</p> <p>MA5: Round & Adjust Year 2 $45 + 19 = 64$ $45 + 20 - 1 = 64$ $65 - 1 = 64$</p>	<p>TO + O bridging the tens. e.g. 24 added to 7</p>  <p>TO + O bridging the tens. e.g. 24 added to 7</p>  <p>TO + TO Not crossing the tens</p> <p>E.g. 43 + 24</p> 	<p>TO + O bridging the tens. e.g. 24 added to 7</p>  <p>TO + TO Not crossing the tens</p> 	<p>TO + O bridging the tens. e.g. 24 added to 7</p>  <p>TO + TO Not crossing the tens</p> <p>A3: Forwards Jump 43 + 24 = 67</p>  <p>A5: Partition Jot $43 + 24 = 67$ $60 + 7 = 67$</p> <p>A4: Partitioning $43 + 24 = 67$ $40 + 20 = 60$ $3 + 4 = 7$ $60 + 7 = 67$</p>	<p>Add</p> <p>Sum</p> <p>More than</p> <p>Total</p> <p>Altogether</p> <p>Plus</p> <p>Digit</p> <p>Partition</p> <p>into tens and ones</p>	<p>100 square</p> <p>Number lines</p> <p>Number tracks</p> <p>Bead strings (for children)</p> <p>Bead bar</p> <p>Tens Frame</p> <p>Numicon</p> <p>Place Value Disks</p> <p>Cuisenaire</p> <p>Base hundreds tens and ones</p> <p>Arrow Cards</p>

add near doubles, e.g. 13 + 14, 39 + 40

MA4: Double & Adjust
Year 1

$$7 + 8 = 15$$

$$7 + 7 + 1$$

$$14 + 1 = 15$$

Recall number bonds to 20 fluently and derive and use related facts to 100

Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.

Can also use Numicon and place value counters

TO + TO

Crossing the tens

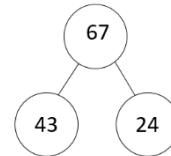
57 added to 25

$$57 + 25 = 82$$

Can also use Numicon and place value counters



67	
43	24



TO + TO

Crossing the tens

TO + TO

Crossing the tens

10s	1s

A3a: Forwards Jump

$$57 + 25 = 82$$

$$+20 \quad +5$$

A5a: Partition Jot

$$57 + 25 = 82$$

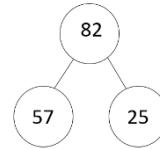
A4a: Partitioning

$$57 + 25 = 82$$

$$50 + 20 = 70$$

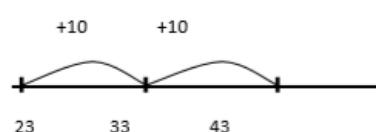
$$7 + 5 = 12$$

$$82$$



82	
57	25

Count or add in multiples of 10 using 100 square number line



or

Add by using partitioning of tens and ones – see above

Solve simple one-step problems with addition: using concrete objects and pictorial representations, involving numbers, quantities and measures - see above

Recognise and use the inverse relationship between addition and subtraction to check calculations and missing number problems. Check by adding numbers in a different order e.g. $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$.

Begin recording addition in columns to support place value and prepare for efficient written methods - see above

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources												
Year 3	<p>Use number bonds to 20 and links to bonds of multiples of 10 to 100, complements to 100 e.g. $45 + 55 = 100$</p> <p>Practise solving varied addition questions mentally with two-digit numbers, the answers could exceed 100.</p> <p>Add numbers mentally, including: a three-digit number and ones</p> <p>a three-digit number and tens</p> <p>a three-digit number and hundreds</p> <p>Recall number bonds to 20 fluently and derive and use related facts to 100</p> <p>Partition numbers in different ways E.g.: $62 = 60 + 2$, $50+12$, $40+22$ etc</p>	<p>TO + TO See Y2 and now crossing 100s and carrying</p> <table border="1"> <tr> <td>100s</td> <td>10s</td> <td>1s</td> </tr> <tr> <td>10 10 10 10 10 10 10 10 10 10 10 10</td> <td>1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</td> <td>1 1 1 1 1 1 1 1 1 1 1 1</td> </tr> </table> <p>HTO + HTO</p> <p>MA2a: Counting On $784 + 60 = 844$ 784 + 60 = 844</p> <p>MA2b: Counting On $534 + 300 = 834$ 534 + 300 = 834</p>	100s	10s	1s	10 10 10 10 10 10 10 10 10 10 10 10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1	<p>TO + TO See Y2 and now crossing 100s</p> <table border="1"> <tr> <td>10s</td> <td>10s</td> <td>1s</td> </tr> <tr> <td>11 11 11 11 11 11 11 11</td> <td>11 11 11 11 11 11</td> <td>11 11 11 11 11 11</td> </tr> </table> <p>HTO + HTO e.g. $243 + 368$</p>	10s	10s	1s	11 11 11 11 11 11 11 11	11 11 11 11 11 11	11 11 11 11 11 11	<p>TO + TO See Y2 and now crossing 100s</p> <p>A3b: Forwards Jump $86 + 48 = 134$ +40 +8 86 126 134</p> <p>A5b: Partition Jot $86 + 48 = 134$ 120 + 14</p> <p>(A7: Column Addition) $\begin{array}{r} & 8 & 6 \\ + & 4 & 8 \\ \hline & 1 & 3 & 4 \end{array}$</p> <p>HTO + HTO</p>	<p>Add</p> <p>Sum</p> <p>More than</p> <p>Total</p> <p>Altogether</p> <p>Plus</p> <p>Partition into tens and ones</p> <p>Empty number line</p> <p>Count on</p> <p>Carry ten</p> <p>addend</p>	<p>100 square</p> <p>Number lines</p> <p>Number tracks</p> <p>Bead strings (for children)</p> <p>Bead bar</p> <p>Tens Frame</p> <p>Numicon</p> <p>Place Value Disks</p> <p>Cuisenaire</p> <p>Base hundreds tens and ones</p> <p>Arrow Cards</p>
100s	10s	1s																
10 10 10 10 10 10 10 10 10 10 10 10	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1 1 1 1 1																
10s	10s	1s																
11 11 11 11 11 11 11 11	11 11 11 11 11 11	11 11 11 11 11 11																

Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.

Know the related vocabulary for addition

addend

$$6 + 4 = 10$$

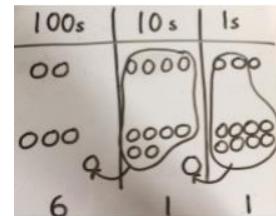
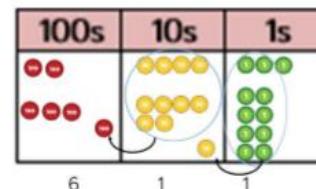
 addend

sum 10
 addend addend
 4 6

addend plus
 addend is equal to the sum

$$22 + 78 = 100$$

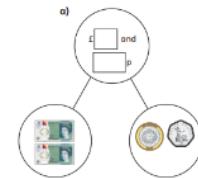
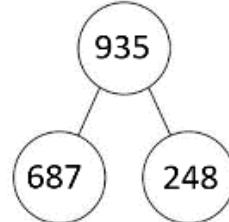
e.g. $243 + 368$



A7: Column Addition

$$\begin{array}{r}
 \text{H} \quad \text{T} \quad \text{U} \\
 \text{6} \quad \text{8} \quad \text{7} \\
 + \text{2} \quad \text{4} \quad \text{8} \\
 \hline
 \text{9} \quad \text{3} \quad \text{5}
 \end{array}$$

$$\begin{array}{r}
 687 \\
 + 248 \\
 \hline
 935
 \end{array}$$



?

£2 and 35p	£1 and 45p	£1 and 34p	£1 and 34p
------------	------------	------------	------------

$$\text{£3 and 45p} + \text{£4 and 34p}$$

$$\text{£3} + \text{£4} = \text{£7}$$

$$45p + 34p = 79p$$

$$\text{£7 and 79p}$$

Decimal point for money is in Y4

Add numbers with up to three digits, using the efficient written methods. Use understanding of place value and partitioning – see above

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

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

Add by using:

- 1) partitioning TU + TU, HTU + TU or HTU + HTU
- 2) Expanded columnar addition
- 3) Compact columnar addition

Where there are more than 2 addends in a column –add up the digits efficiently

$$416 + 223 + 184 = 823$$

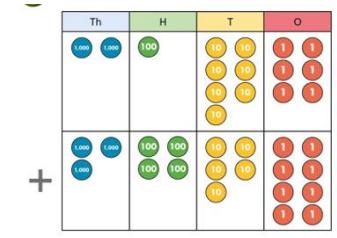
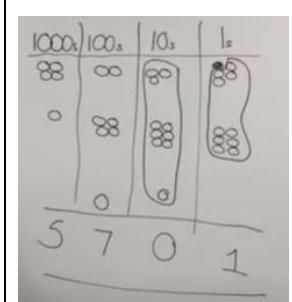
Diagram illustrating compact columnar addition for the sum $416 + 223 + 184 = 823$. The digits are arranged in columns: hundreds (4, 2, 1), tens (1, 2, 8), and ones (6, 3, 4). Orange clouds labeled 'make 10' show the tens column being partitioned into 2+2 and 8+2. Blue clouds labeled 'double' show the ones column being partitioned into 6+4 and 3+4. The result is 823.

$$15 + 57 + 27 = 99$$

Diagram illustrating compact columnar addition for the sum $15 + 57 + 27 = 99$. The digits are arranged in columns: tens (1, 5, 2) and ones (5, 7, 7). A blue cloud labeled 'double' shows the ones column being partitioned into 5+5 and 7+7. The result is 99.

$$172 + 234 + 54 = 460$$

Diagram illustrating compact columnar addition for the sum $172 + 234 + 54 = 460$. The digits are arranged in columns: hundreds (1, 2, 5), tens (7, 3, 4), and ones (2, 4, 4). Orange clouds labeled 'make 10' show the tens column being partitioned into 2+3 and 4+4. Blue clouds labeled 'double' show the ones column being partitioned into 2+2 and 4+4. The result is 460.

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 4	<p>Practise mental methods with increasingly large numbers to aid fluency</p> <p>Add numbers mentally, including:</p> <p>A 3-digit number and hundreds</p> <p>MA2a: Counting On Year 5 $837 + 500 = 1337$ +500 837 1337</p> <p>A 4-digit number and thousands</p> <p>MA2b: Counting On Year 4 $4837 + 3000 = 7837$ +3000 4837 7837</p> <p>Add any pair of two-digit numbers, including crossing the tens and 100 boundary, e.g. 47 + 58</p> <p>add a near multiple of 10, e.g. 45 + 39</p> <p>MA5: Round & Adjust $45 + 39 = 84$ $45 + 40 - 1$ $85 - 1 = 84$</p>	<p>Use of place value counters to add TH H T O and also money to</p> <p></p>	<p>Use of place value grid</p> <p></p>	<p>TH H T O + TH H T O</p> <p>A7d: Column Addition Th H T U 4873 $+ 3762$ $\underline{8635}$</p> <p>Decimals - same number of digits</p> <p>A7h: Column Addition T U 76.7 $+ 58.5$ $\underline{135.2}$</p> <p>Money up to 4 digits</p> <p>A7i: Column Addition With Money $\pounds 38.25$ $+ \pounds 27.46$ $\underline{\pounds 65.71}$</p>	<p>Add</p> <p>Sum</p> <p>More than</p> <p>Total</p> <p>Altogether</p> <p>Plus</p> <p>Partition into tens and ones</p> <p>Empty number line</p> <p>Count on</p> <p>Carry ten</p> <p>Carry 100</p> <p>Two-digit</p> <p>Three-digit</p> <p>Crossing tens boundary</p> <p>Inverse</p>	<p>100 square</p> <p>Number lines</p> <p>Number tracks</p> <p>Bead strings (for children)</p> <p>Bead bar</p> <p>Tens Frame</p> <p>Numicon</p> <p>Place Value Disks</p> <p>Cuisenaire</p> <p>Base hundreds tens and ones</p> <p>Arrow Cards</p>

Add near doubles of two-digit numbers,
e.g. $38 + 37$

MA4: Double & Adjust

$37 + 38 = 75$

$37 + 37 + 1$

$74 + 1 = 75$

Understand addition as inverse of subtraction

Know the related vocabulary for addition

addend \downarrow **sum** \downarrow
 $6 + 4 = 10$
 \uparrow **addend**

sum 10

addend	addend
4	6

addend
plus
addend
is equal to the
sum

$$\begin{array}{r} 22 \\ + 78 \\ \hline 100 \end{array}$$

Compact columnar addition

Add numbers with up to 4 digits using the efficient written column method Practise with increasingly large numbers to aid fluency.

Estimate and use inverse operations to check answers

Solve addition two-step problems in contexts, deciding which operations and methods to use and why. Include problems involving decimals in money or measures e.g. $6.3\text{m} + 3.7\text{m} = 10\text{m}$

Where there are more than 2 addends in a column –add up the digits efficiently

$$416 + 223 + 184 = 823$$

make 10 \downarrow $4 \ 1 \ 6$
 $2 \ 2 \ 3$
+ $1 \ 8 \ 4$
 $\hline 8 \ 2 \ 3$
1 1

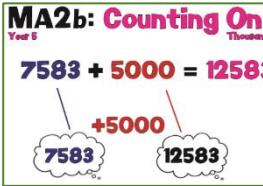
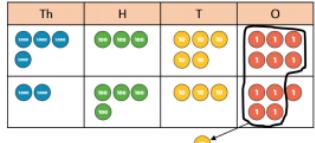
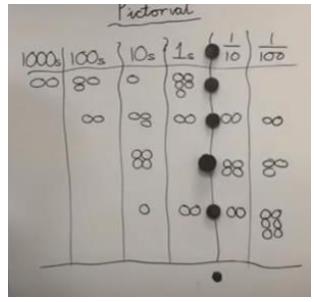
$$15 + 57 + 27 = 99$$

$1 \ 5$
 $5 \ 7$
+ $2 \ 7$
 $\hline 9 \ 9$
1

$$172 + 234 + 54 = 460$$

make 10 \downarrow $1 \ 7 \ 2$
 $2 \ 3 \ 4$
+ $5 \ 4$
 $\hline 4 \ 6 \ 0$
1 1

addend

	Mental Strategies	Concrete	Pictorial	Abstract	Vocabulary	Models, Images and resources
Year 5 And Year 6	<p>Y5 Add numbers mentally with increasingly large numbers to aid fluency e.g. $12\ 462 + 2\ 300 = 14\ 762$</p> <p>MA2b: Counting On <small>Year 5</small> $7583 + 5000 = 12583$</p>  <p>Use rounding to check answers and determine levels of accuracy</p> <p>MA4: Double & Adjust <small>Year 5</small> $125 + 127 = 252$ $125 + 125 + 2 = 250 + 2 = 252$</p> <p>MA5: Round & Adjust <small>Year 4</small> $345 + 298 = 643$ $345 + 300 - 2 = 645 - 2 = 643$</p> <p>MA5: Round & Adjust <small>Year 5</small> $4645 + 1996 = 6641$ $4645 + 2000 - 4 = 6645 - 4 = 6641$</p> <p>Add pairs of decimal fractions each with units and tenths, e.g. $5.7 + 2.5, 6.3 + 4.8$</p>	<p>Use of place value counters to add up to 6 digits</p>  <p>Concrete A concrete model using Numicon and base 10 blocks to show column addition with regrouping.</p>	<p>Use of place value grid</p> 	<p>Varied sized numbers up to millions or 3DP added using compact method. Includes measures and money</p> <p>Decimals - same and different number of digits</p> <p>A7j: Column Addition <small>With Decimals</small> $73.4 + 5.67 = 79.07$</p> <p>MA1: Partitioning <small>Year 6</small> $4.73 + 2.21 = 6.94$ 6 + 0.9 + 0.44 = 6.94</p> <p>A7e: Column Addition <small>M H Th T Th Th H T U</small> $787567 + 446278 = 1233845$</p>	<p>Add</p> <p>Sum</p> <p>More than</p> <p>Total</p> <p>Altogether</p> <p>Plus</p> <p>Partition into tens and ones</p> <p>Empty number line</p> <p>Count on</p> <p>Carry ten</p> <p>Carry 100</p> <p>Two-digit</p> <p>Three-digit</p> <p>Crossing tens boundary</p> <p>Inverse</p>	<p>100 square</p> <p>Number lines</p> <p>Number tracks</p> <p>Bead strings (for children)</p> <p>Bead bar</p> <p>Tens Frame</p> <p>Numicon</p> <p>Place Value Disks</p> <p>Cuisenaire</p> <p>Base hundreds tens and ones</p> <p>Arrow Cards</p>

<p>Y6</p> <p>Calculate mentally with increasingly large numbers and more complex calculations. Including Counting on in multiples</p> <p>MA2a: Counting On Year 6 Ten Thousands</p> <p>$43,826 + 30,000 = 73,826$</p> <p>+30,000 43,826 73,826</p> <p>Addition facts for multiples of 10 to 1000 and decimal numbers with one decimal place, e.g.</p> <p>$650 + \underline{\quad} = 930$ $\underline{\quad} + 1.4 = 2.5$</p> <p>MA5: Round & Adjust Year 6</p> <p>$45.2 + 49.9 = 95.1$ $45.2 + 50 - 0.1$ $95.2 - 0.1 = 95.1$</p> <p>MA4: Double & Adjust Year 6</p> <p>$4.5 + 4.7 = 9.2$ $4.5 + 4.5 + 0.2$ $9 + 0.2 = 9.2$</p> <p>Know the related vocabulary for addition See the images from Y4</p>	<p>Compact columnar addition Add numbers with up to 4 digits using the efficient written column method Practise with increasingly large numbers to aid fluency.</p> <p>Estimate and use inverse operations to check answers Solve addition two-step problems in contexts, deciding which operations and methods to use and why. Include problems involving decimals in money or measures e.g. $6.3m + 3.7m = 10m$</p> <p>Practise addition for larger numbers, using the efficient written methods of columnar addition.</p> <p>Where there are more than 2 addends in a column –add up the digits efficiently</p> <p>416 + 223 + 184 = 823</p> <p>make 10 4 1 6 2 2 3 + 1 8 4 8 2 3 1 1</p> <p>15 + 57 + 27 = 99</p> <p>1 5 5 7 + 2 7 9 9 1</p> <p>172 + 234 + 54 = 460</p> <p>make 10 1 7 2 2 3 4 + 5 4 4 6 0 1 1</p>	<p>addend</p>
--	--	---------------