Thousands	<u>Hundreds</u>	<u>Tens</u>	<u>Ones</u>		<u>Tenths</u>	<u>Hundredths</u>	<u>Thousandths</u>
				•			
1000s	100s	10s	1s		1/10s	1/100s	1/1000s
				•			
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Written Methods Calculation Policy

<u>Number Lines</u>: regardless of which operation is being used, smallest & largest numbers must be at the 'correct' end (place value needed so children know which is the smallest & largest number).

Smallest Number

Formal Written Methods Must:

- show operation symbol
- carry underneath
- exchange by crossing through and rewriting above

Year 1:

Objects (concrete), number tracks (visual), written equations (abstract). Maths Mastery big picture. Show addition can be done in any order.





Jane had 3 bears. She was given 2 more. How many does she have now?

Largest Number



Exchange Game (to prepare for formal written addition): e.g.

using dienes blocks or other objects:

roll a dice & take 1-6 'ones'.

When have ten, 'swap' for a 'ten'.

When have ten 'tens', swap for a 'hundreds'.

When have ten 'hundreds', swap for a 'thousand'.







Partitioning & recombining when exchanging - using concrete objects to support.

47 + 76 =

Use dienes blocks to represent the numbers in correct columns.

Add together, starting from the ones and exchange where necessary – carry over into the new column. Then recombine. Partitioning and recombining. $42 \rightarrow 40 + 2$ $+36 \rightarrow \underline{30 + 6}$ $\underline{70 + 8} \rightarrow 78$ $37 \rightarrow 30 + 7$ $+ 85 \rightarrow \underline{80 + 5}$ $\underline{110 + 12} \rightarrow 122$



<u>Year 3:</u>



Column Addition - adding ones first, then tens and recombining. 4 3 <u>+</u> 5 4

7 <u>90</u> <u>97</u>

<u>Year 4:</u>

Column Addition - adding ones first, then tens, then 100s and recombining.				
358				
<u>+33</u>				
1 1				
80				
<u>300</u>				
<u>391</u>				

Compact Column Method – adding from ones and carrying <u>underneath</u>.

358
<u>+ 3 3</u>
<u>391</u>
1
8 + 3 = 11. So place the one and carry ten.
50 _ 30 + 10 = 90
300 + no hundreds is 300

<u>Year 5 & 6:</u>

Compact Column Method, extending to 4 digit numbers; 2 decimal places; different number of decimal places and adding more than 2 numbers.



Number line method to add time, in minutes and hours (as time is measured in 60 minutes, not hundreds).



Subtraction:

<u>Year 1</u>

Objects (concrete), number tracks/drawings (visual), written equations (abstract).



<u>Year 2</u>

Use of concrete to consolidate but moving towards number lines and column methods.



Find the difference:

Use place value knowledge to add to the nearest ten, add in tens and then ones.

e.g. What is the difference between 23 and 18? (Counting on)





<u>Year 3</u>

Continue pictorial methods (see above) moving onto the abstract formal written column methods, including HT1s - HT1s, with concrete objects to support (e.g. dienes blocks)

3 digit subtract 3 digits (using dienes blocks to consolidate from Yr 2) $874 \rightarrow 800 + 70 + 4$ $-523 \rightarrow \underline{500 + 20 + 3}$ $300 + 50 + 1 \rightarrow 351$ Including exchanging: $200 \quad 120$ $326 \rightarrow \underline{500 + 20} + 6$ $-152 \rightarrow \underline{100 + 50 + 2}$ $\underline{100 + 70 + 4} = 174$

<u>Year 4</u>

Consolidate column method with partitioning, then move to compact method.



Year 5 & 6: Use column compact method for a wider range of applications.



Multiplication:

X10 and x100

Years 2 and 3: move digits written method Years 4 - 6: mental calculations (including decimals)

100s	10s	1s	<u>1</u> 10
	3	4	
3	4	0	
		3	7
	3	7	

<u>Year 1</u>

Use of concrete objects and pictorial representation.

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





Find patterns on 100s squares for x2, x5, x10:

Year 2: (times tables- x2, x5, x10) Building on skills of counting in 2s, 5s and 10s.



Arrays:

Support understanding that the multiplication of 2 numbers can be done in any order.

3 x 4 (3 rows of 4)



 4×3 (4 rows of 3)



<u>Year 3</u>



Introduce multiplying with formal vertical method. Begin by multiplying with the 'ones' digits. Introduce exchanging underneath.

$$\begin{array}{c}
2 4 \\
\times 6 \\
2 4 (6 \times 4) \\
\underline{\times 6} \\
1 20 (6 \times 20) \\
\underline{1 4 4} \\
2
\end{array}$$

<u>Year 4</u>

Consolidate column method from Yr 3 including carrying underneath (as in addition).				
24 <u>× 6</u> <u>144</u> 2	354 <u>x 4</u> <u>1416</u> 21			

<u>Year 5 & 6</u>

Vertical Multiplication, including 4 digits x	2 digit numbers and decimals.					
$ \begin{array}{c} 2 4 6 \\ \times 32 \\ 4 9 2 \\ 7 3 8 0 \\ \hline 7 8 7 2 \end{array} $	36.4 <u>×7</u> <u>254</u> 42					
5246						
<u>x 26</u>						
$31_{1}4_{2}7_{3}6$						
<u>104920</u> place holder						
<u>136396</u>						

Doubling and x 4

Partition, x2 and then recombine:



$X4 \rightarrow$ double and double again



Division:

<u>Year 1</u>

Consolidate counting to prepare for formal division. Using concrete objects (bead string, cubes, Numicon) and pictorial representations.

Halving - sharing concrete objects into two groups.

<u>Year 2</u>

Introduce the language 'division' and the symbol '÷'





<u> Year 3</u>





<u>Year 4</u>



<u>Year 5</u>



<u>Year 6</u>



