




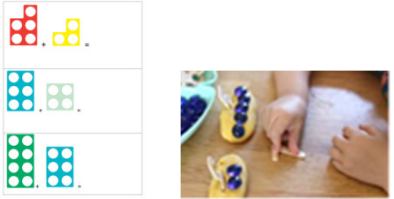
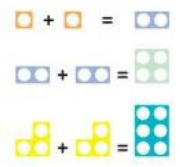

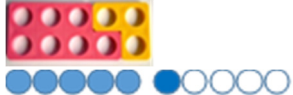



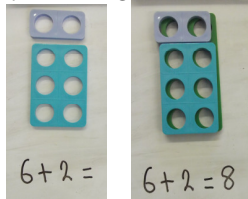
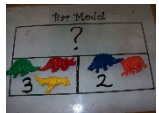








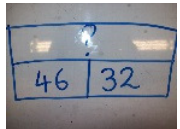
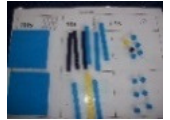
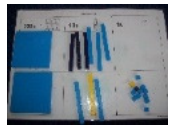



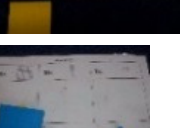
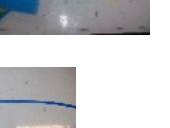
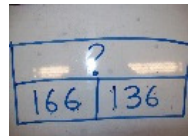
# Montpelier Primary School

## Calculation Policy

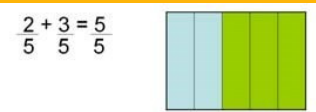
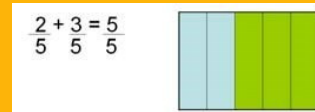
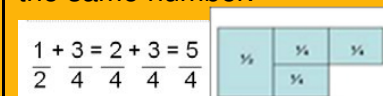
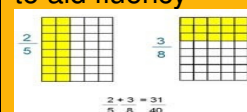


## Calculation Policy- Addition



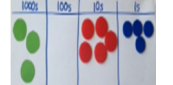

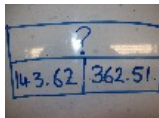
Year	FS	1	2	3
Mental Calculations and Methods	Count and order numbers to 20. Count out objects from a larger group. Add single digit numbers by counting all. Add single digit numbers by counting on. Number bonds: 2, 3, 4. Doubles up to 5. Use vocabulary such as 'more' and 'fewer' to compare sets. Give one more mentally. Use vocabulary of addition to talk about practical activities/problems.	Number bonds: 5, 6, 7, 8, 9, 10, 11. Add 10. Doubles up to 10. Largest number first. 1 more. Add one-digit and two-digit numbers to 20, including zero Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$	Number bonds: 20, 12, 13, 14, 15, 16, 17, 18, 19. Recall and use addition facts to 20 fluently, and derive and use related facts up to 100 Add 1 digit to 2 digits by bridging. Partition second number, add tens then ones and recombine. Add 10 and multiples of 10. Doubles up to 20 and multiples of 5. Add near multiples of 10. Add and subtract numbers using concrete objects, pictorial representations, and mentally, including.	Add 1 and 2 digit numbers to 3 digit numbers. Add multiples of 10, 100 to 3 digit numbers. Add multiplies of 10 and 100. Know pairs of 100 Add single digit bridging through boundaries. Partition second number to add and recombine. Use near doubles to add. Add near multiples of 10 and 100 by rounding and adjusting.
			Counting in fractions up to 10, starting from any numbers and using the $\frac{1}{2}$ and $\frac{2}{4}$ equivalence on the number line 	Addition of fractions with the same denominator within one whole. $\frac{2}{5} + \frac{3}{5} = \frac{5}{5}$ 
Written Methods	Mark making to represent numbers- correct formation of numbers to 10. Pictorial representations of problems.	Read, write and interpret mathematical statements involving addition (+), and equals (=) signs	Add two two-digit numbers using concrete objects, pictorial representations progressing to formal written methods.  $\begin{array}{r} 40 + 9 \\ + 20 + 3 \\ \hline 60 + 12 = 72 \end{array}$  $\begin{array}{r} 49 \\ + 23 \\ \hline 72 \end{array}$	Add numbers with up to three digits, using formal written methods of columnar addition with regrouping to carry. $\begin{array}{r} 166 \\ + 136 \\ \hline 302 \\ 11 \end{array}$

Year	FS	1	2	3
Developing conceptual understanding	<p>Counting on songs, rhymes games and with apparatus. Count all and 1 more with apparatus.</p>  <p>Doubles</p>  <p>Using numbers as labels for counting.</p> 	<p>Number bonds to 10 with apparatus:</p>  <p>Use bonds of 10 to calculate bonds of 20</p> <p>Count all:</p>  <p>= 13 Count on: 8+5= 13</p>  <p>=13</p> <p>Count on, on number track, in 1s 8 + 5 = 13</p>  <p>Use Numicon to represent addition (including dienes in summer term):</p>  <p>6 + 2 = 6 + 2 = 8</p> <p>Bar Model:</p>  	<p>Number track / Number line – jumps of 1 then efficient jumps using number bonds 18 + 5 = 23</p>  <p>46 + 27 = 73 Count in tens then bridge.</p>  <p>25 + 29 by + 30 then -1 (Round and adjust)</p>  <p>Dienes 10s and 1s:</p> <p>46 + 32</p>  <p>Show 46 and 32</p>  <p>Combine the 1s</p>  <p>Combine the 10s</p>  <p>Bar Model:</p> 	<p>Dienes 100s, 10s, 1s</p> <p>166+136</p>  <p>Show 166 and 136</p>  <p>Combine the 1s,</p>  <p>Regroup the 1s for a 10. Record 2 in units column and put 1 under 10s column.</p>  <p>Combine the 10s</p>  <p>Regroup the 10s for a 100. Write 0 in the 10s column and 1 under 100s column.</p>  <p>Combine 100s and record 3 in 100s column.</p>  <p>Bar model:</p> 

## Calculation Policy- Addition

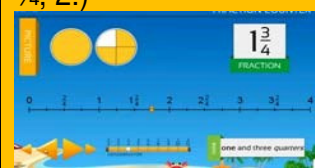

Year	3	4	5	6
<b>Mental Calculations Mental methods</b>	Add 1 and 2 digit numbers to 3 digit numbers. Add multiples of 10, 100 to 3 digit numbers. Add multiples of 10 and 100. Know pairs of 100 Add single digit bridging through boundaries. Partition second number to add and recombine. Use near doubles to add. Add near multiples of 10 and 100 by rounding and adjusting.	Continue to add numbers mentally. Add 1s, 10s and 100s to 3 digit number. Add multiples of 10s, 100s, 1000s. Fluency of 2 digit + 2 digit. Partition second number to add then recombine. Decimal pairs of 10 and 1. Use near doubles to add. Add near multiples. Solve addition two-step problems in contexts, deciding which operations and methods to use and why.	Add multiples of 10s, 100s, 1000s, tenths. Fluency of 2 digit + 2 digit including with decimals. Partition second number to add then recombine. Use number facts, bridging and place value. Adjust numbers to add. Add numbers mentally with increasingly large numbers	Perform mental calculations, including with mixed operations and large numbers Add multiples of 10s, 100s, 1000s, tenths, hundredths. Fluency of 2 digit + 2 digit including with decimals. Partition second number to add then recombine. Use number facts, bridging and place value. Adjust numbers to add.
<b>Fractions</b>	Addition of fractions with the same denominator within one whole. 	Addition of fractions with the same denominator within one whole. 	Add fractions with the same denominator and denominators that are multiples of the same number.  Recognise mixed number fractions and improper fractions and convert from one to the other and write mathematical statements e.g. $2/5 + 4/5 = 6/5 = 1 \frac{1}{5}$	Add fractions with different denominators and mixed numbers, using the concept of equivalent fractions. Start with fractions where the denominator of one fraction is a multiple of the other (e.g. $1/2 + 1/8 = 5/8$ ) and progress to varied and increasingly complex problems Practice calculations with simple fractions and decimal equivalents to aid fluency 
<b>Written Methods</b>	Add numbers with up to three digits, using formal written methods of columnar addition with regrouping to carry. $\begin{array}{r} 166 \\ + 136 \\ \hline 302 \\ 11 \end{array}$	Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate. $\begin{array}{r} 2458 \\ + 596 \\ \hline 3054 \\ 111 \end{array}$	Add whole numbers with more than 4 digits, including using formal written methods (columnar addition). $\begin{array}{r} 23454 \\ + 596 \\ \hline 24050 \\ 111 \end{array}$	Solve addition multi-step problems in contexts, deciding which operations and methods to use and why.

# Calculation Policy- Addition

Year	3	4	5	6
Developing conceptual understanding	<p>Dienes 100s, 10s, 1s 166+136</p> <p>Show 166 and 136</p>  <p>Combine the 1s,</p>  <p>Regroup the 1s for a 10. Record 2 in units column and put 1 under 10s column.</p>  <p>Combine the 10s</p>  <p>Regroup the 10s for a 100. Write 0 in the 10s column and 1 under 100s column.</p>  <p>Combine 100s and record 3 in 100s column.</p>  <p>Bar Model:</p> 	<p>Place Value Counters or Diennes</p> <p>2458 + 596</p> <p>Show 2458 and 596</p>  <p>Combine the 1s. Exchange ten 1s for a 10 counter.</p>  <p>Combine the 10s. Exchange ten 10s for a 100 counter.</p>  <p>Combine the 100s. Exchange ten 100s for a 1000 counter</p>  <p>Read final answer Three thousand and fifty-four.</p>  <p>Bar Model:</p> 	<p>Place value counters.</p> <p>Set out the calculation in columns.</p>  <p>Combine the 0.01s. Write 3 in the 0.01 column.</p>  <p>Combine the 0.1s. Write 1 in the 0.1 column and regroup the others for 1.</p>  <p>Write 1 under the units column.</p>  <p>Combine the 1s. Record 6 in the 1s column.</p>  <p>Combine the 10s. regroup the 10s for 100, Record 0 in the 10s and 1</p>  <p>Under the 100s Combine the 100s. Record 6 in the 100s.</p>  <p>Bar model:</p> 	



## Calculation Policy- Subtraction

Year	FS	1	2	3
<b>Mental Calculations and Methods</b>	One less with the support of a number line. Count back from 10. Practical activities involving subtraction. 1-1 counting.	Number bonds, subtraction: 5, 6, 7, 8, 9, 10. 1 less. Count back Subtract 10. Difference between by counting on. Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$	10 less. Number bonds, subtraction: 20, 12, 13, 14, 15, 16, 17, 18, 19. Subtract 1 digit from 2 digits by bridging. Partition second number, count back in 10s then 1s. Subtract 10 and multiples of 10. Subtract near multiples of 10. Difference between by counting on. Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100.	Subtract 1 and 2 digit numbers from 3 digit numbers. Subtract single digit by bridging through boundaries. Partition second number to subtract. Subtract multiples of 10 and 100. Difference between by counting on. Subtract near multiples of 10 and 100 by rounding and adjusting.
<b>Fractions</b>			Pupils should count in fractions up to 10, starting from any number and using the and equivalence on the number line (for example, $1\frac{1}{4}$ , $1\frac{1}{2}$ , $1\frac{3}{4}$ , 2.) 	Count down in tenths. Subtract fractions with the same denominator within one whole. <div style="border: 1px solid black; padding: 5px; width: fit-content;"> <math display="block">\begin{array}{r} 3 \\ - 1 \\ \hline 2 \end{array}</math> <math display="block">\begin{array}{r} 6 \\ 6 \\ 6 \end{array}</math> </div> Represent using the bar model 
<b>Written Methods</b>	Own mark making to represent numbers. Pictorial representations of problems. Correct formation of numerals to 10.	Read, write and interpret mathematical statements involving subtraction (−) and equals (=) signs	Subtract two two-digit numbers using concrete objects, pictorial representations progressing to formal written methods <div style="text-align: right;"> <math display="block">\begin{array}{r} 61 \\ 73 \\ - 46 \\ \hline 27 \end{array}</math> </div>	Subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction <div style="text-align: right;"> <math display="block">\begin{array}{r} 2131 \\ - 344 \\ \hline 187 \end{array}</math> </div>

# Calculation Policy- Subtraction

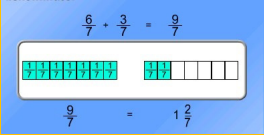
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Developing conceptual understanding	Counting back songs, rhymes and games.	Number bonds (Ten frame)	Number track / Number line – jumps of 1 then efficient jumps using number bonds	Taking away and exchanging, 344 – 187
	Practical jumping back on a class number line. 	Difference between 7 and 10 	$23 - 5 = 18$ Using a number line, $73 - 46 = 26$ 	Set up 344 
	One less with apparatus. 	6 less than 10 is 4 	Difference between 73–58 by counting up, $58 + \_ = 73$ 	Regroup a ten for ten ones. 
	Practical subtraction. 	Count out, then count how many are left.  $7 - 4 = 3$	Taking away with dienes 68-24 Get out dienes for the First number. 	Then subtract 7 units from the 14 units. 
	Numicon, missing pieces. 	Count back on a number track, then number line. $15 - 6 = 9$ 	Subtract the ones first.  Then subtract the tens. 	Regroup a hundred for 10 tens.  Then subtract 8 tens from the 140.  Finally subtract 100 from the 2 hundreds. 

Bar Model:

$$344 - 187 =$$

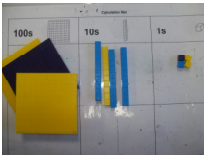
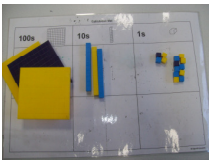
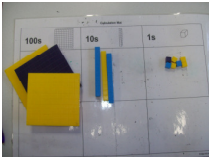
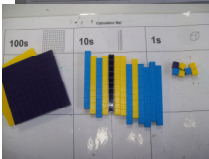
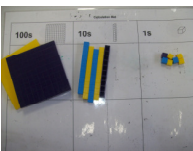
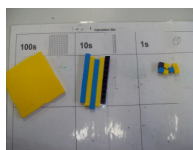
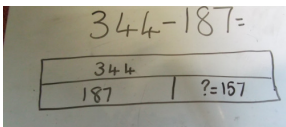
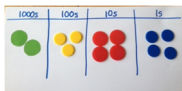
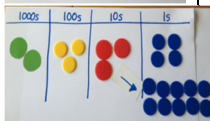

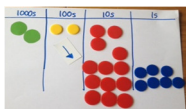
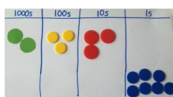
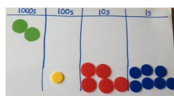
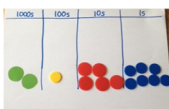
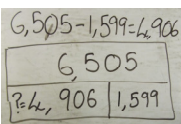
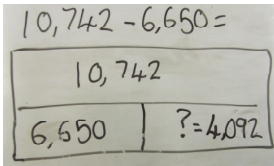
344	187	157
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## Calculation Policy- Subtraction

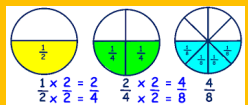
Year	3	4	5	6
<b>Mental Calculations and Methods</b>	Subtract 1 and 2 digit numbers from 3 digit numbers. Subtract single digit by bridging through boundaries. Partition second number to subtract. Subtract multiples of 10 and 100. Difference between by counting on. Subtract near multiples of 10 and 100 by rounding and adjusting.	Subtract multiples of 10s , 100s, 1000s. Fluency of 2 digit subtract 2 digit numbers. Partition second number to subtract. Decimal subtraction from 10 or 1. Difference between by counting on. Subtract near multiples by rounding and adjusting. Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why	Subtract multiples of 10s , 100s, 1000s, tenths. Fluency of 2 digit - 2 digit including with decimals. Partition second number to subtract. Difference between. Adjust numbers to subtract. Subtract numbers mentally with increasingly large numbers. E.g. 12 462 – 2300 = 10 162 Use rounding to check answers. Practice subtracting decimals, including a mix of whole numbers and decimals and decimals with different numbers of decimal places. Mentally subtract tenths and one-digit whole numbers and tenths.	Perform mental calculations, including with mixed operations and large numbers. Use estimation to check answers to calculations. Subtract multiples of 10s, 100s, 1000s, tenths and hundredths. Partition second number to subtract. Use number facts bridging and place value. Adjust numbers to subtract. Difference between.
<b>Fractions</b>	Count down in tenths. Subtract fractions with the same denominator within one whole. $\frac{3}{6} - \frac{1}{6} = \frac{2}{6}$ Represent using the bar model 	Count down in hundredths. Subtract fractions with the same denominator. Solve simple measure and money problems involving fractions and decimals to two decimal places. 	Use physical and pictorial representations to stress the place value relationships between money, decimals and whole numbers e.g. place value mat.	Subtract fractions with different denominators and mixed numbers. Practice calculations with simple fractions and decimal fraction equivalents to aid fluency.
<b>Written Methods</b>	Subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction $\begin{array}{r} 2 \quad 3 \quad 1 \\ 2344 \\ - 187 \\ \hline 157 \end{array}$	Subtract numbers with up to 4 digits using the formal written methods of columnar addition where appropriate. $\begin{array}{r} 2 \quad 3 \quad 1 \\ 2344 \\ - 187 \\ \hline 2157 \end{array}$	Subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) $\begin{array}{r} 2 \quad 3 \quad 1 \\ 52344 \\ - 1187 \\ \hline 51157 \end{array}$	Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.








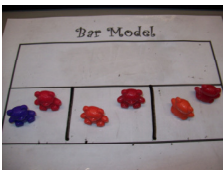




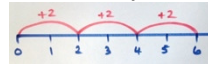
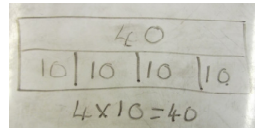
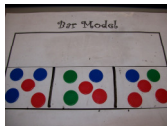


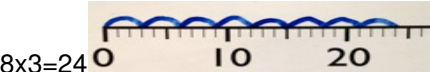

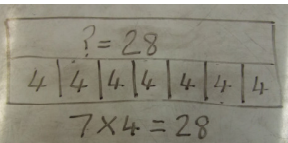
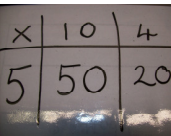

# Calculation Policy- Subtraction

Year	3	4	5	6
Developing conceptual understanding	<p>Taking away and exchanging, <math>344 - 187</math></p> <p>Set up 344</p>  <p>Regroup a ten for ten ones.</p>  <p>Then subtract 7 units from the 14 units.</p>  <p>Regroup a hundred for 10 tens.</p>  <p>Then subtract 8 tens from the 140.</p>  <p>Finally subtract 100 from the 2 hundreds.</p>  <p>Bar Model:</p> 	<p>Taking away and exchanging, <math>2344 - 187</math> Place value counters (complete the calculation in the same way with Diennes).</p> <p>Find the one hundred and eighty- seven.</p>  <p>Exchange a 10 for ten 1s to create two thousand, three hundred and thirty and fourteen.</p>  <p>Then take away 'seven'.</p>  <p>Exchange a 100 for ten 10s to create two thousand, two hundred, thirteen tens and seven.</p>  <p>Then take away 'eighty'.</p>  <p>Then take away 'one hundred'</p>  <p>There are no thousands to take away.</p>  <p>Bar Model:</p> 	<p>Set out the calculation in columns</p> $\begin{array}{r} 52344 \\ - 1187 \\ \hline \end{array}$ <p>The 1s column: four subtract seven. Because seven is greater than four, exchange a 10 for ten 1s. So there are now three 10s and fourteen 1s. Fourteen 1s subtract seven 1s makes seven 1s – record this.</p> $\begin{array}{r} 52344 \\ - 1187 \\ \hline 7 \end{array}$ <p>The 10s column: three subtract eight. Because eight is greater than three, Exchange a 100 for ten 10s. So there are now two 100s and thirteen 10s.</p> $\begin{array}{r} 52344 \\ - 1187 \\ \hline 57 \end{array}$ <p>Thirteen 10s subtract eight 10s makes five 10s – record this. The 100s column: two subtract one. Two 100s subtract one 100 makes one 100 – record this.</p> $\begin{array}{r} 52344 \\ - 1187 \\ \hline 257 \end{array}$ <p>The 1000s column: two subtract one. Two 1000s subtract one 1000 makes one 1000 – record this.</p> $\begin{array}{r} 52344 \\ - 1187 \\ \hline 1157 \end{array}$ <p>The 10,000s column: there are only five 10000s with nothing to subtract. So record 5.</p> $\begin{array}{r} 52344 \\ - 1187 \\ \hline 51157 \end{array}$ <p>Bar Model:</p> 	

## Calculation Policy- Multiplication

Year	FS	1	2	3
<b>Mental Calculations and Methods</b>	Doubling with apparatus. Count in 2's	Count in 2s, 10s, 5s, . Doubles up to 10. Double multiples of 10 Solve one-step problems involving multiplication.	2 x, 10x, 5x multiplication facts Doubles up to 20 and multiples of 5. Count in 3s. Recognise odd and even numbers. Show that multiplication of two numbers can be done in any order (commutative- $5 \times 4 = 4 \times 5$ ). Solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts	Review 2x, 5x and 10x multiplication facts. 4x, 8x, 3x, 6x multiplication facts (using doubling patterns). Double two digit numbers. Develop efficient mental methods using commutativity $5 \times 4 = 4 \times 5$ and associativity $(2 \times 4) \times 3 = 2 \times (4 \times 3)$ . Derive related multiplication and division facts. Calculate multiplication statements including 2 digit multiplied by 1 digit. Partitioning-multiply the tens first then the ones. ( $39 \times 7 = 30 \times 7 + 9 \times 7$ )
<b>Fractions</b>			Write simple fractions for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ . Begin to relate multiplication and division models to fractions and measures.	Recognise and show using diagrams, equivalent fractions with small denominators. 
<b>Written Methods</b>	Children begin to record in the context of play, practical activities, or problem solving.	Encourage children to begin to write it as repeated addition in preparation for Year 2. e.g. , $2+2+2+2=8$	Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals (=) signs.	Write and calculate mathematical statements for $\div$ using the $\times$ tables they know progressing to formal written methods.

## Calculation Policy- Multiplication





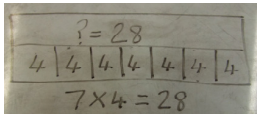
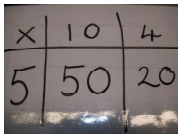


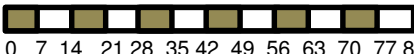
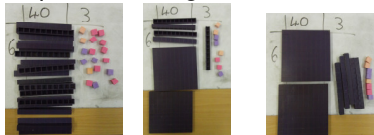
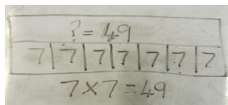

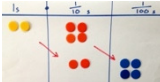
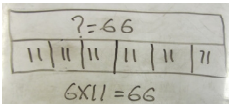
Year	FS	1	2	3
Developing conceptual understanding	<p>Practical examples. E.g. How many wellies for three children?</p> <p>Doubling in practical contexts. E.g. adding spots to ladybirds.</p> <p>Using fingers and dominoes.</p>	<p>Represent multiplication facts using objects: 2 frogs on each of the 3 lily pads: <math>3 \times 2 = 6</math></p>  <p>2 groups of 3: <math>2 \times 3 = 6</math></p>  <p>Represent multiplication facts using Numicon: <math>3 \times 2 = 6</math> 3 groups of 2:</p>  <p>Represent multiplication facts using bead strings:</p>  <p>Link to repeated addition:</p>  <p>Bar Model:</p> 	<p>Represent multiplication facts using objects: <math>5 \times 3 = 15</math> 5 frogs on each lily pad</p>  <p>Represent 3 groups of 5 using bead strings.</p>  <p>Represent multiplication facts using Numicon: <math>5 \times 2 = 2 \times 5</math></p>  <p>Build multiplication facts on counting stick</p>  <p>Link to repeated addition:</p>  <p>Bar Model:</p>  	<p>Show multiplication using arrays: <math>13 \times 4 = (10 \times 4) + (3 \times 4)</math></p>  <p>Build multiplication facts on counting stick: <math>12 \times 3 = 36</math></p>  <p>Show tables on a number line</p>  <p>Represent using Diennes:</p>  <p>Bar Model:</p>  <p>Grid Method:</p>  

## Calculation Policy- Multiplication

Year	3	4	5	6
Mental Calculations and Methods	Review 2x, 5x and 10x multiplication facts. 4x, 8x, 3x, 6x multiplication facts (using doubling patterns). Double two digit numbers. Develop efficient mental methods using commutativity $5 \times 4 = 4 \times 5$ and associativity $(2 \times 4) \times 3 = 2 \times (4 \times 3)$ . Derive related multiplication and division facts. Calculate multiplication statements including 2 digit multiplied by 1 digit. Partitioning-multiply the tens first then the ones. ( $39 \times 7 = 30 \times 7 + 9 \times 7$ )	Review 2x, 5x, 10x, 4x, 8x, 3x, and 6x multiplication facts. 10 times bigger. 7x, 9x, 11x, 12x multiplication facts. Double larger numbers and decimals. Recognise and use factor pairs and commutativity ( $5 \times 4 = 4 \times 5$ ) in mental calculations. Multiply by 0 and 1. Multiplying together three numbers (using the associative law $(2 \times 4) \times 3 = 2 \times (4 \times 3)$ ). Practice mental methods and extend this to three-digit numbers to derive facts, (for example $3 \times 200 = 600$ can be derived from $2 \times 3 = 6$ )	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers Establish whether a number up to 100 is prime. Recognise and use cube and square numbers. Multiplication facts up to $12 \times 12$ . 10, 100, 1000 times bigger. Double larger numbers and decimals. Partition to multiply mentally. Multiply whole numbers and those involving decimals by 10, 100 and 1000.	Perform mental calculations, including with mixed operations and large numbers (increasingly large numbers & more complex calculations). Use estimation to check answers to calculations. Know the square numbers up to $12 \times 12$ & derive the corresponding squares of multiples of 10 e.g. $80 \times 80 = 6400$ Multiply numbers by 10, 100 and 1000 giving answers up to three decimal places. Review multiplication facts up to $12 \times 12$ . Partition to multiply mentally larger numbers. Double larger numbers and decimals.
	Recognise and show using diagrams, equivalent fractions with small denominators. 	Recognise and show, using diagrams, families of common equivalent fractions. Understand the relation between non-unit fractions and multiplication of quantities, with particular emphasis on tenths and hundredths. Make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Use factors and multiples to recognise equivalent fractions and simplify where appropriate.	Multiply mixed numbers and proper fractions by whole number, supported by diagrams and materials. Identify name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. Scaling by finding $\frac{1}{4}$ of $\frac{1}{2}$  	Multiply simple pairs of proper fractions writing the answer in its simplest form. E.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ 



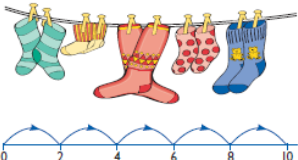

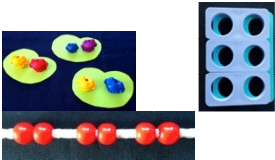

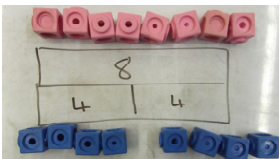

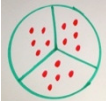



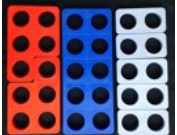
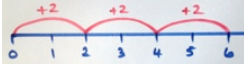
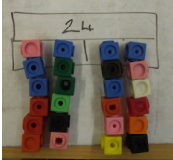
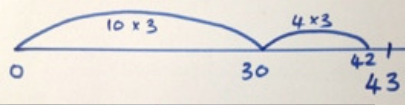
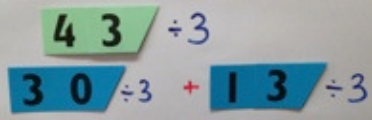

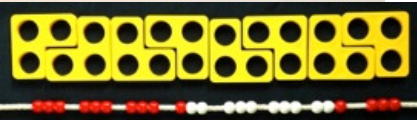
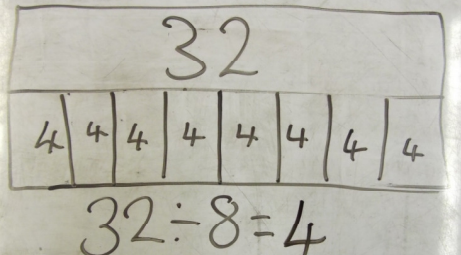
# Calculation Policy- Multiplication

Year	3	4	5	6																		
Written Methods	Write and calculate mathematical statements for ÷ using the x tables they know progressing to formal written methods.	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout $\begin{array}{r} 243 \\ \times 6 \\ \hline 1,458 \end{array}$	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 $\begin{array}{r} 1,432 \\ \times 36 \\ \hline 8,592 \\ 42,960 \\ \hline 51,552 \end{array}$	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. $\begin{array}{r} 32,592 \\ \times 36 \\ \hline 195,552 \end{array}$																		
Developing conceptual understanding	Show multiplication using arrays: $13 \times 4 = (10 \times 4) + (3 \times 4)$   Build multiplication facts on counting stick: $12 \times 3 = 36$   Show tables on a number line $8 \times 3 = 24$   Represent using Diennes:   Bar Model:   Grid Method:  	Grid method: <table border="1"><tr><td>x</td><td>40</td><td>3</td></tr><tr><td>6</td><td>240</td><td>18</td></tr></table> Represent using Place Value counters:  Partition and multiply- exchange- regroup. $43 \times 6$ by partitioning $40 \times 6 = 240$ $3 \times 6 = 18$ $43 \times 6 = 258$ If I know $4 \times 6 = 24$ then $40 \times 6$ is ten times bigger.  Build multiplication facts on counting stick: $12 \times 7 = 84$   Represent using Diennes:  Partition and multiply- exchange- regroup  Bar Model: 	x	40	3	6	240	18	Represent using Place value counters:  Partition and multiply- exchange- regroup  Grid method linked to formal written method: <table border="1"><tr><td>x</td><td>200</td><td>40</td><td>3</td></tr><tr><td>30</td><td>6000</td><td>1200</td><td>90</td></tr><tr><td>6</td><td>1200</td><td>240</td><td>18</td></tr></table> If I know $4 \times 6$ then $0.4 \times 6$ is ten times smaller $0.4 \times 0.6$ is ten times smaller again   Multiply $1,432 \times 6$ ( $6 \times 2$ , $6 \times 30$ , $6 \times 400$ , $6 \times 1000$ ) Carried numbers are recorded above 1,432. $\begin{array}{r} 1,432 \\ \times 36 \\ \hline 8,592 \end{array}$  Then multiply $1,432 \times 30$ ( $30 \times 2$ , $30 \times 30$ , $30 \times 400$ , $30 \times 1000$ ) $\begin{array}{r} 1,432 \\ \times 36 \\ \hline 8,592 \\ 42,960 \\ \hline 51,552 \end{array}$  Then use column addition to find the total of the products. $\begin{array}{r} 1,432 \\ \times 36 \\ \hline 8,592 \\ 42,960 \\ \hline 51,552 \end{array}$  Bar Model: 	x	200	40	3	30	6000	1200	90	6	1200	240	18	(When multiplying begin with units and carry above the calculation to ensure numbers are not confused when adding)
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x	200	40	3																			
30	6000	1200	90																			
6	1200	240	18																			



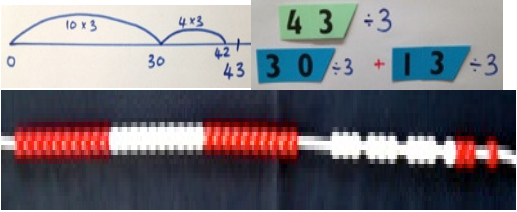
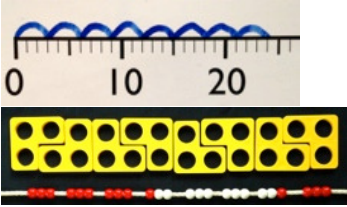
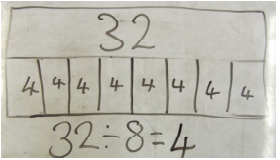

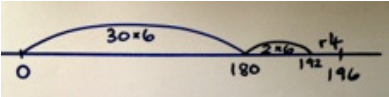
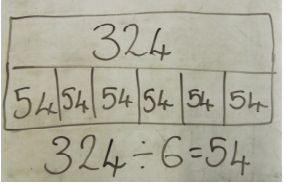
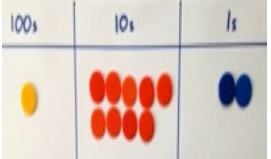


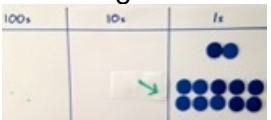

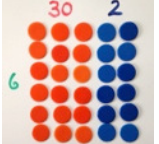
## Calculation Policy- Division

Year	FS	1	2	3
<b>Mental Calculations and Methods</b>	Play experiences using everyday situations. E.g. laying the table.	Count back in 2s, 10s, 5s Halves up to 10 Halve multiples of 10. How many 2s- 5s- 10s- are in? Solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher	Recognising odd and even numbers. Division facts (2 x, 10x, 5 x) Halves up to 20 Count back in 3s Show that division of one number by another cannot be done in any order. Solve problems involving division.	Review division facts (2x, 5x, 10x) Division facts (4 x, 8 x and 3 x, 6x) Halve two digit numbers Write and calculate mathematical statements for division using the multiplication tables that they know.
<b>Fractions</b>		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 Children should begin to explore finding simple fractions of objects, numbers and quantities.	Children should be given opportunities to find a half, a quarter and a third of shapes, objects, numbers and quantities. Finding a fraction of a number of objects to be related to sharing. They will explore visually and understand how some fractions are equivalent – e.g. two quarters is the same as one half.	Count up and down in tenths; recognise that tenths arise from dividing an object or number into 10 equal parts. Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. Recognise and show, using diagrams, equivalent fractions with small denominators. Children should be given the opportunity to further develop understanding of division (sharing) to be used to find a fractions.
<b>Written Methods</b>	Pictorial representations and mark making.	Pictorial representations.	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs	<div>           Write and calculate mathematical statements for <math>\div</math> using the x tables they know including for two-digit by one-digit progressing to formal written methods.         </div> <div>           Informal-Chunking:  <math>43 \div 3 =</math>  <math>14 \text{ r } 1</math>  <math>3 \quad 43</math>  <math>\begin{array}{r} \underline{-30} \quad (10 \times 3) \\ 13 \\ \underline{-12} \quad (4 \times 3) \\ 01 \end{array}</math>            Formal short division:  <math>98 \div 7</math> becomes  <math>\begin{array}{r} 14 \\ 7 \overline{) 98} \end{array}</math> </div>

Year	FS	1	2	3
Developing conceptual understanding	<p>Understanding the notion of fairness and its application in equal sharing.</p> <p>Use real-life experiences, e.g. sharing fairly pieces of fruit at snack time, sharing out cards before beginning a game of dominoes etc.</p> <p>Share quantities of items into appropriate sized groups for practical purposes (e.g. Lego wheels into groups of 4) and talk about how many children will be able to have a set. Sharing spots onto two ladybirds.</p> <p>Halving e.g. a piece of cake, sandwich.</p> <p>Finding two matching Numicon pieces to make a whole number.</p>	<p>Children should begin to understand division as both sharing and grouping.</p> <p></p> <p>Sharing – 6 frogs are shared between 2 lily pads. How many frogs are on each?</p> <p></p> <p>Grouping- How many 2's are in 6? Two frogs sit on each lily pad. How many Lily pads are there?</p> <p></p> <p>Jumps on a number line:</p> <p></p> <p>Use real life experiences such as sharing raisins, money, and biscuits.</p> <p>Bar model:</p> <p></p>	<p>Pupils decode a problem first, then use manipulatives and jottings and finally record symbolically.</p> <p>Understand division as sharing and grouping</p> <p><math>15 \div 3 = 5</math> in each group (sharing)</p> <p></p> <p></p> <p></p> <p><math>15 \div 3 = 5</math> groups of 3 (grouping)</p> <p></p> <p></p> <p>Use language of division linked to tables</p> <p><math>10 \div 2 = 5</math>   <math>10 \div 5 = 2</math></p> <p>Represent using Numicon:</p> <p></p> <p>How many 2s?</p> <p></p> <p>Bar Model:</p> <p></p>	<p>Grouping using partitioning</p> <p><math>43 \div 3</math> If I know <math>10 \times 3</math> then I work out <math>13 \div 3</math></p> <p></p> <p></p> <p>Use language of division linked to tables</p> <p>How many 3s?</p> <p></p> <p></p> <p>Bar Model:</p> <p></p>

## Calculation Policy- Division

Year	3	4	5	6
<b>Mental Calculations and Methods</b>	Review division facts (2x, 5x, 10x) Division facts (4 x, 8 x and 3 x, 6x) Halve two digit numbers Write and calculate mathematical statements for division using the multiplication tables that they know.	Review division facts (2x, 5x, 10x, 4x, 8x) 10 times smaller Division facts (3x, 6 x, 12x, 3x, 9x, 11x, 7x) Halve larger numbers and decimals. Use place value, known and derived facts to divide by 1.	Review division facts (2x, 5x, 10x, 4x, 8x, 3x, 6 x, 12x, 9x, 11x, 7x) Divide whole no's and decimals by 10, 100 and 1000. Partition to divide mentally Halve larger numbers and decimals Partition decimals to divide mentally	Recall prime numbers up to 19 Perform mental calculations including mixed operations and large numbers. Division facts (up to 12 x 12) Partition to divide mentally Halve larger numbers and decimals.
<b>Fractions</b>	Count up and down in tenths; recognise that tenths arise from dividing an object or number into 10 equal parts. Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. Recognise and show, using diagrams, equivalent fractions with small denominators. Children should be given the opportunity to further develop understanding of division (sharing) to be used to find a fractions.	Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.  Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths		Divide proper fractions by whole numbers. Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction. Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to 3 decimal places use written division methods where needed.
<b>Written Methods</b>	Write and calculate mathematical statements for ÷ using the x tables they know including for two-digit by one-digit progressing to formal written methods.  Informal-Chunking: $43 \div 3 =$ $\begin{array}{r} 14 \text{ r } 1 \\ 3 \overline{) 43} \\ \underline{-30} \quad (10 \times 3) \\ 13 \\ \underline{-12} \quad (4 \times 3) \\ 01 \end{array}$ Formal short division: $98 \div 7$ becomes $\begin{array}{r} 14 \\ 7 \overline{) 98} \end{array}$	Continue to write and calculate mathematical statements for ÷ using the x tables they know progressing to formal written methods.  Informal-Chunking: $43 \div 3 =$ $\begin{array}{r} 14 \text{ r } 1 \\ 3 \overline{) 43} \\ \underline{-30} \quad (10 \times 3) \\ 13 \\ \underline{-12} \quad (4 \times 3) \\ 01 \end{array}$ Formal short division: $98 \div 7$ becomes $\begin{array}{r} 14 \\ 7 \overline{) 98} \end{array}$	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. Moving on to dividing numbers up to 4 digits by a two-digit number using the formal written method of long division.  Formal short division: $432 \div 5$ becomes $\begin{array}{r} 86 \text{ r } 2 \\ 5 \overline{) 432} \\ \underline{40} \quad 32 \\ \underline{30} \quad 22 \\ \underline{20} \quad 2 \end{array}$ Formal long division: $564 \div 13$ $\begin{array}{r} 43 \text{ r } 5 \\ 13 \overline{) 564} \\ \underline{52} \quad 44 \\ \underline{39} \quad 50 \\ \underline{39} \quad 110 \\ \underline{104} \quad 6 \end{array}$	Divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division and interpret remainders appropriately for the context. $564 \div 13$ $\begin{array}{r} 43 \text{ r } 5 \\ 13 \overline{) 564} \\ \underline{52} \quad 44 \\ \underline{39} \quad 50 \\ \underline{39} \quad 110 \\ \underline{104} \quad 6 \end{array}$ $= 43 \text{ r } 5 = 43 \frac{5}{13} = 43.4 \text{ (to 1dp)}$

Year	3	4	5	6
Developing conceptual understanding	<p>Grouping using partitioning  <math>43 \div 3</math> If I know <math>10 \times 3</math> then I work out <math>13 \div 3</math></p>  <p>Use language of division linked to tables          How many 3s?</p>  <p>Represent using place value counters or Diennes:</p> <p>Bar Model:</p> 	<p>Grouping using partitioning  <math>196 \div 6</math> If I know <math>3 \times 6 \dots</math> then <math>30 \times 6</math> then I work out <math>16 \div 6</math></p>  <p><math>=30 \quad =2 \text{ r}4 \quad =32 \text{ r}4</math></p> <p>'Chunking up' on a number line  <math>196 \div 6 = 32 \text{ r}4</math></p>  <p>Use language of division linked to tables. How many 6's are in 196?</p> <p>Represent using place value counters or Diennes:</p> <p>Bar Model:</p> 	<p><math>192 \div 6</math> using place value counters to support written method:</p>  <p>Exchange one 100 for ten 10s</p>  <p>19 tens into groups of 6:</p>  <p>3 groups so that is <math>30 \times 6</math>, exchange remaining 10 for ten 1s</p>  <p>12 ones split into groups of 6:</p>  <p>So <math>192 \div 6 = 32</math></p> 	

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