

Together we enjoy, create and achieve

Caversham Park Primary School

Maths Calculation Policy

This policy has been drawn from the White Rose calculation policy and other sources.



Mental Maths Calculation Policy Overview

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Counting	<p>Counting forwards and backwards in 1s to and beyond 10.</p> <p>Counting forwards and backwards in 10s to one hundred</p> <p>Begin to count in 5s and 2s forwards and backwards (if able)</p>	<p>Counting in 1s on and back to 100 with then without a hundred square</p> <p>Counting on and back in 10s from any number to one hundred with then without a hundred square.</p> <p>Counting forwards and backwards in 2s 5s and 10s from 0.</p>	<p>Counting forwards and backwards in 10s and 1^s to 100 and over (practice crossing 100 boundary)</p> <p>Counting forwards and backwards in 2s 5s and 10s from any number (not always starting at 0)</p> <p>Begin to count in 3s from 0 (with then without a hundred square)</p>	<p>Counting forwards and backwards in 1s, 10s, 100s from any 2 or 3 digit number crossing 1000 boundary.</p> <p>Counting forwards and backwards in 2s 5s crossing 100 boundaries and from any number.</p> <p>Counting forwards and backwards in 3s, 4s and 8s from any number to 100 (with then without hundred square)</p> <p>Count forwards and backwards in 50s and 100s.</p> <p>Make links between multiples of 2, 4, 8.</p> <p>Count up and down in tenths seeing decimals notation. Use money. (10ps 0.10)</p>	<p>Counting forwards and backwards in 10s, 100s, 1000s from any 3 or 4 digit number crossing 10,000 boundaries.</p> <p>Counting in tenths and hundredths crossing units boundary. (Use hundred square, bead string and coins, decimal and fraction cards.)</p> <p>Counting forwards and backwards in multiples of 6, 7, 9, 11, 12</p> <p>Make links between multiples of 3, 6, 12 and 2, 4, 8</p> <p>Count in multiples of 25 relate to quarters.</p> <p>Count backwards through zero into negative numbers</p>	<p>Counting in all powers of 10 crossing boundaries up to 1 million.</p> <p>Counting in tenths, hundredths crossing boundaries. (Use hundred square, bead string and coins, decimal, fraction cards and percentage.)</p> <p>Counting in thousandths crossing boundaries.</p> <p>Counting in positive and negative numbers.</p>	<p>Counting in all powers of 10 crossing boundaries up to 10 million.</p> <p>Counting in tenths, hundredths and thousandths crossing boundaries.</p> <p>Use negative numbers in context and calculate intervals across 0.</p>



Caversham Park Primary School Calculation Policy

<p>Addition</p>	<p>Exploring numbers to 5 in practical contexts.</p> <p>Recognising a number on my fingers/dice.</p> <p>Beginning to recall number facts of all numbers to 5 For example $2+3=5$ $1+4=5$ $2+2=4$</p>	<p>Starting at the bigger number and counting on using number line/cubes and fingers.</p> <p>Learning addition facts of all numbers to 10 (e.g. $3+4=7$)</p> <p>Relate addition facts to 10 to those to 20.</p> <p>$4 + 6 = 10$ $14 + 6 = 20$</p> <p>Begin to learn by heart addition facts which cross 10 e.g. $4 + 7 = 11$</p> <p>Say 1 more than a given number and</p>	<p>Adding three single digits (using known pairs)</p> <p>Adding 9 or 11 using ten and adjust.</p> <p>Using known number facts to 10 to calculate number facts to 20 e.g. $12+6$</p> <p>Learning by heart facts which bridge 10. E.g. $5+7$</p>	<p>Continue to practice number facts which bridge 10 e.g. $8+5$ Link to multiples of 10 e.g. $80+50$</p> <p>Continue adding 9 or 11 using 10 and adjusting. Extend to adding 29 or 31 by adding nearest multiple of 10 and adjusting.</p> <p>Mental addition of 2 digit numbers (abstract)</p> <p>Mental addition of multiples of 100s 10s or 1 to any 3 digit number.</p> <p>Recognise pairs of multiples of 100 with a total of 1000</p> <p>Recognise pairs of multiples of 5 with a total of 100</p>	<p>Practice adding multiples of 10, 100 and 1000 using number bonds as base facts. (focus on crossing boundaries)</p> <p>Find 1000 more than any given number.</p> <p>Practice mental addition from Year 3- partitioning, using near multiples e.g. $+59$ by adding $60 - 1$ Add 91 by adding 90 and then add 1.</p>	<p>Practice adding powers of 10 using number bonds and place value facts.,</p> <p>Add easy 2 and 3 digit numbers fluently.</p> <p>Add fractions where denominators are the same.</p>	<p>Practice adding powers of 10 using number bonds and place value facts.,</p> <p>Use place value and number facts to solve problems in algebraic form.</p>
-----------------	---	--	--	---	--	--	---



Caversham Park Primary School Calculation Policy

<p>Subtraction</p>	<p>Beginning to recall facts for numbers to 5</p> <p>$5-3=2$ $4-2=2$</p> <p>Counting up to find a small difference to 5 or 10 (if able)</p> <p>Find one less than numbers to 20.</p>	<p>Starting at the bigger number and counting back using number line/cubes and fingers.</p> <p>Learning subtraction facts of all numbers to 10 (e.g. $3+4=7$)</p> <p>Relate subtraction facts to 10 to those to 20.</p> <p>$4+6=10$ $14+6=20$</p> <p>Begin to learn by heart subtraction facts which cross 10 e.g. $11+4=7$</p> <p>Say 1 less than a given number and</p> <p>Counting up to find a small difference in numbers to 10 then 50 and 100</p>	<p>Subtracting 9 or 11 using ten and adjust.</p> <p>Continue to learn and practice number facts to 10 to and 20 calculate number facts to 20 e.g. $12-8=$</p> <p>Learning by heart facts which bridge 10. E.g. $12-5=7$</p> <p>Count up to find a small difference in numbers to 100</p>	<p>Continue to practice subtraction facts which bridge 10 e.g. $8+5$ Link to multiples of 10 e.g. $80+50$</p> <p>Continue subtract 9 or 11 using 10 and adjusting. Extend to subtracting 29 or 31 by adding nearest multiple of 10 and adjusting.</p> <p>Mental subtract of 2 digit numbers (abstract)</p> <p>Mental subtraction of multiples of 100s 10s or 1 to any 3 digit number.</p> <p>Count up to find small differences in numbers to 1000</p>	<p>Practice subtracting multiples of 10, 100 and 1000 using number bonds as base facts. (focus on crossing boundaries)</p> <p>Find 1000 less than any given number.</p> <p>Practice mental subtraction from Year 3- partitioning, using near multiples e.g. - 59 by subtracting $60+1$ Subtract 91 by Subtracting 90 and then subtracting 1.</p> <p>Count up to find small differences in numbers to 10,000</p>	<p>Practice subtracting powers of 10 using number bonds and place value facts.</p> <p>Subtract easy 2 and 3 digit numbers fluently.</p> <p>Subtract fractions where denominators are the same.</p> <p>Practice mental subtraction from Year 3 and 4- partitioning, using near multiples e.g. - 559 by subtracting $560+1$ Subtract 901 by Subtracting 900 and then subtracting 1.</p> <p>Count up to find small differences in numbers to 1 million</p>	<p>Practice subtracting powers of 10 using number bonds and place value facts.,</p> <p>Use place value and number facts to solve problems in algebraic form.</p>
--------------------	--	--	--	--	--	--	--



Caversham Park Primary School Calculation Policy

<p>Multiplication</p>	<p>Begin to learn by heart some doubles if able</p> <p>e.g. double 2 is 4</p>	<p>Know by heart doubles of all numbers to at least 10 + 10</p> <p>Begin to learn 10x table facts and link to counting in 10s.</p>	<p>Learn 2x 5 x10 tables- spend at least a term learning each one (1 at a time)</p> <p>Practice doubles to 20 including those which require partitioning e.g. 14+14=</p>	<p>Learn 3x, 4x, 8x tables.</p> <p>Continue to practice 2x 5 x 10.</p> <p>Practice multiplying a number by 10 using practical resources (place value grids)</p> <p>Use times table facts and place value to multiply multiples of 10 and 100 e.g 2x 5 = 2x 50 = 100</p>	<p>Learn 6x 7x 9x 11x 12x tables by heart (spend a term learning each one)</p> <p>Continue to practice the rest of the tables.</p> <p>Multiply numbers by 10 and 100 using place value grids. Include decimals to 1 place.</p> <p>Use times table facts and place value to multiply multiples of 10 and 100 e.g. Use chains:</p> <p>$2 \times 0.5 = 1$ $2 \times 5 = 10$ $2 \times 50 = 100$ $2 \times 500 = 1,000$ $2 \times 5000 = 10,000$</p>	<p>Apply all multiplication tables to 12 x 12 to calculating with powers of 10 and decimals.</p> <p>Multiply numbers by 10, 100 and 1000 including to decimals with 3 decimal places</p>	<p>Apply all multiplication tables to 12 x 12 to calculating with powers of 10 and decimals.</p> <p>Multiply numbers by 10, 100 and 1000 including to decimals with 3 decimal places</p> <p>Use place value and number facts to solve problems in algebraic form.</p>
-----------------------	---	--	--	---	---	--	---



Caversham Park Primary School Calculation Policy

Division		<p>Halve even numbers to 20.</p> <p>Begin to learn 10x table division facts and link to counting in 10s.</p>	<p>Practice division facts for 2x 5x 10x tables relating to multiplication and fractions.</p> <p>Know halves of all numbers to 20.</p>	<p>Relate division facts for 3x 4x 8x to multiplication facts.</p> <p>Continue to practice division facts for 2x 5x 10.</p> <p>Practice dividing a number by 10 using practical resources (place value grids)</p>	<p>Practice division facts for 6x 7x 9x 11x 12 alongside learning multiplication facts and link to fractions.</p> <p>Divide numbers by 10 and 100 using place value grids. Include decimals to 1 place. Use times table facts and place value to multiply multiples of 10 and 100 e.g. Use chains: $1 \div 2 = 0.5$ $10 \div 2 = 5$ $100 \div 2 = 50$ $1000 \div 2 = 500$ $10,000 \div 2 = 5000$</p>	<p>Use the rapid recall of table and division facts to 12 x 12 to identify prime numbers to 100.</p> <p>Divide numbers by 10, 100 and 1000 including to decimals with 3 decimal places.</p> <p>Apply knowledge of table facts and place value to divide multiples of 10, 100, 1000, 10,000, 100,000 e.g. $500,000 \div 50 =$</p>	<p>Use the rapid recall of table and division facts to 12 x 12 to identify prime numbers to 100.</p> <p>Divide numbers by 10, 100 and 1000 including to decimals with 3 decimal places.</p> <p>Apply knowledge of table facts and place value to divide multiples of 10, 100, 1000, 10,000, 100,000 e.g. $500,000 \div 50 =$</p> <p>Use place value and number facts to solve problems in algebraic form.</p>
----------	--	--	--	---	---	---	--



Caversham Park Primary School Calculation Policy

Rounding	Exploring on number tracks/lines is 6 closer to 10?	Practice number boundaries 16 lies between 10 and 20. Say hello to the next 10 or the 10 before..	Practice number boundaries 23 lies between 20 and 30.	Practice number boundaries. 130 lies between 100 and 200. 23 lies between 20 and 30.	Round numbers to the nearest 10 and 100 and 1000 Practice number boundaries 4500 lies between 4000 and 5000 4550 lies between 4500 and 4600	Round numbers to the nearest 10, 100, 1000, 10,000 and 100, 000 Practice number boundaries 45000 lies between 40000 and 50000 45500 lies between 45000 and 46000	Round any number to the nearest required degree of accuracy.
Properties of number	Use correct mathematical language at all times when describing number. Larger, smaller, ones etc.	Identify multiples of 10.	Use terms multiples and factors alongside learning times tables.	Use terms multiples and factors alongside learning times tables.	Use terms multiples and factors alongside learning times tables.	Use terms multiples and factors alongside learning times tables. Learn square numbers Learn cube numbers Recall prime numbers to 19 and identify to 100 Identify multiples of factors, including factor pairs, prime factors and common factors of two numbers	Identify common factors, common multiples and prime numbers




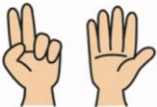


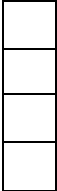

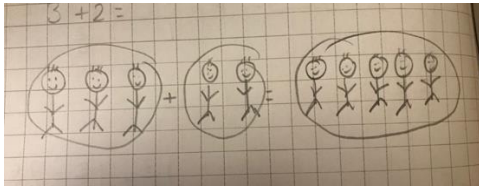
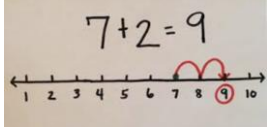




Caversham Park Primary School Calculation Policy

Fractions, decimals and percentage			Find $1/10$, $1/5$ 1,2 of numbers relating to times tables.	Find $1/3$ $\frac{1}{4}$ $1/8$ of numbers relating to times tables. Begin to add decimals with 1 digit using place value (no crossing boundaries) use number facts.	Find unit fractions of numbers based on the times tables they are practicing. Add and subtract numbers with 1 decimal place mentally.	Begin to know equivalence of basic fractions, decimals and percentages. 10% 25% 50% 75% $\frac{1}{4}$ $1/3$ $1/5$ $1/10$ $1/100$ $1/1000$ Mentally add simple decimals to 1 and 2 places.	Know equivalence of basic fractions to decimals and percentages 10 % 25% 50% 75% $\frac{1}{4}$ $1/3$ $1/5$ $1/10$ $1/100$ $1/1000$ Mentally add simple decimals to 1,2 and 3 places.
------------------------------------	--	--	--	--	--	---	---



Written Calculation Policy Overview

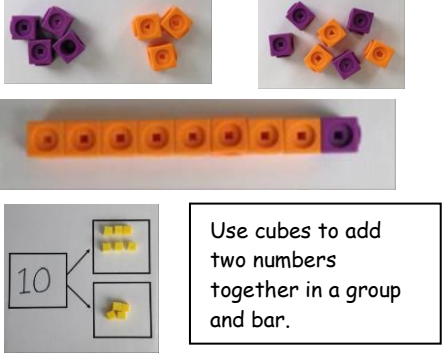
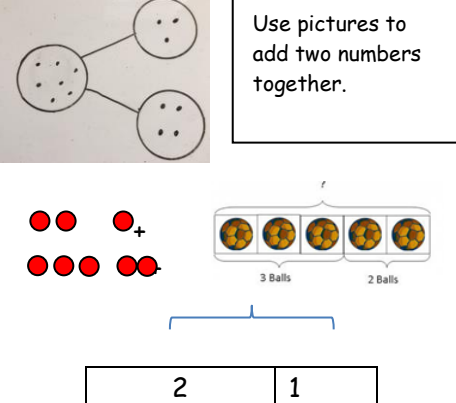
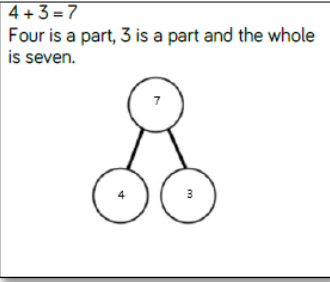
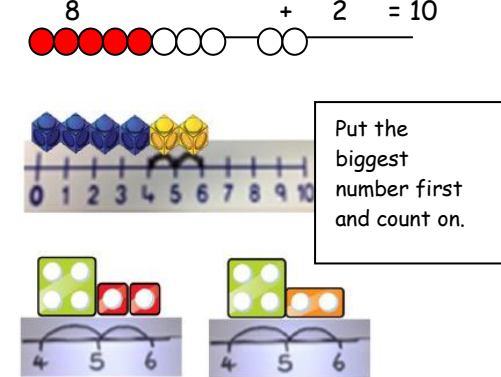
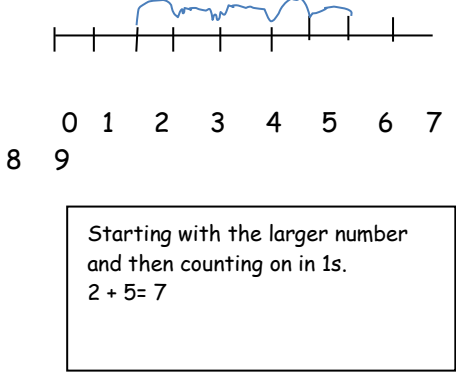
Addition- Reception

Objective	Concrete	Pictorial	Abstract
<p>To find the total of two objects by counting all of them</p> <p>To add single-digit numbers and count on to find the answer.</p>	<p>Children use a range of practical resources to combine and total. These may include objects (e.g. animals), cubes, counters, numicon, fingers, bead strings and much more!</p>   $2 + 5 = 7$   	<p>Record calculations using pictures</p>  $2 + 2 = 4$ 	<p>Use prepared number lines to count on.</p> <p>These can include using practical objects to move along the number line (cubes, plasticine) as well as drawing.</p>  <p>There are 5 animals on a farm. 3 more join. How many are there? Children hold 5 in head and count on 3 on fingers.</p>
<p>To find one more than a given number</p>	<p>Children use practical objects and resource such as multilink to add 1 more</p> <p>Bead strings can also be used</p>  	<p>Numicon/ Number tracks can be used to find one more. Place counter on a given number. What is 1 more? e? What is the next number?</p>  	<p>Number lines can be used to find 1 more than numbers.</p>



Written Calculation Policy Overview

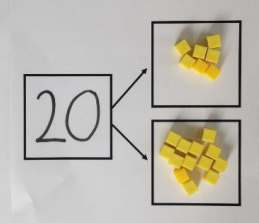
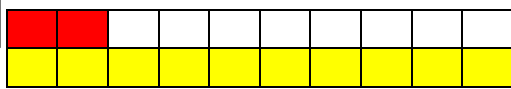
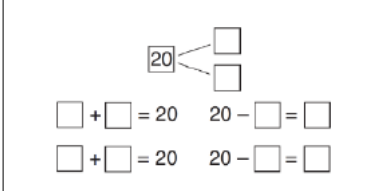
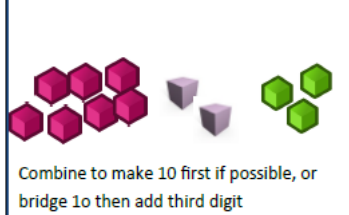
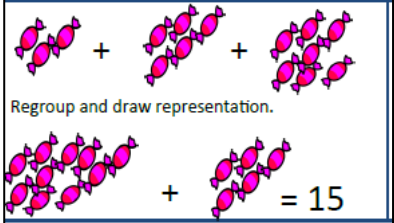
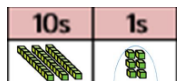
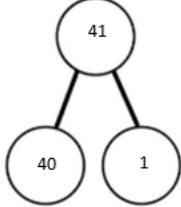
Addition- Year One

Objective	Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole part. (Part- whole model)</p>	 <p>Use cubes to add two numbers together in a group and bar.</p>	 <p>Use pictures to add two numbers together.</p>	<p>$4 + 3 = 7$ Four is a part, 3 is a part and the whole is seven.</p> 
<p>Starting on the bigger number and counting on.</p>	<p>$8 + 2 = 10$</p>  <p>Put the biggest number first and count on.</p>	 <p>Starting with the larger number and then counting on in 1s. $2 + 5 = 7$</p>	<p>$15 + 6 =$</p> <p>Place the larger number in your head and count on to find the smaller number.</p>



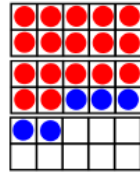
Written Calculation Policy Overview

Addition-Year Two

Objective	Concrete	Pictorial	Abstract				
<p>Using known number facts within 20.</p> <p>(Relate number facts to 10 to number facts to 20 and relate number facts to 10 to number facts to 100)</p> <p>Adding multiples of 10</p>	 <p>Children explore ways to make 20</p> $\square\square + \square\square = \square\square\square\square$ $\square\square + \square\square = \square\square\square\square$ $3 + 3 = 6$ $30 + 30 = 60$	$2 + ? = 10$ $12 + ? = 20$  $\begin{array}{c} \cdot\cdot + \cdot\cdot = \cdot\cdot\cdot\cdot \\ \text{ } + \text{ } = \text{ } \end{array}$ $3 + 4 = 7$ $30 + 40 = 70$	 $\square + \square = 20 \quad 20 - \square = \square$ $\square + \square = 20 \quad 20 - \square = \square$ $3 + 4 = 7$ $30 + ?? = 70$ <table border="1" data-bbox="1646 670 2072 742"> <tr> <td colspan="2" style="text-align: center;">?</td> </tr> <tr> <td style="text-align: center;">30</td> <td style="text-align: center;">40</td> </tr> </table>	?		30	40
?							
30	40						
<p>Adding 3 single digit numbers</p>	 <p>Combine to make 10 first if possible, or bridge 10 then add third digit</p>	 <p>Regroup and draw representation.</p> $\begin{array}{c} \text{Candy} + \text{Candy} + \text{Candy} \\ \text{Candy} + \text{Candy} = 15 \end{array}$	<p>For a string of single digit numbers - find pairs that make 10</p> $\overbrace{7 + 4 + 3}^{10} \quad 10 + 4 = 14$ <p>Record 'missing numbers' in calculations, e.g. $\square + 2 = 5$</p>				
<p>Partitioning numbers into tens and one</p>	<p>Children use denes/arrow cards/place value counters to partition numbers.</p> $36 = 30 + 6$ 	<p>Children to represent the base 10 e.g. lines for tens and dots for ones.</p>	 <p>Children practice partitioning tens and ones.</p>				



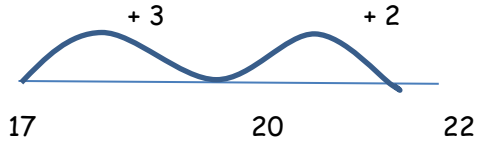
Adding a 2 digit number and a 1 digit number
(Magic 10- part whole model)



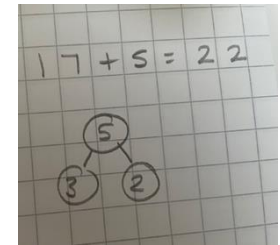
17 + 5 = 22
Use ten frame to make 'magic ten'

Or use denes to explore.

17 + 5 = 22
3 2



17 + 5 = 22

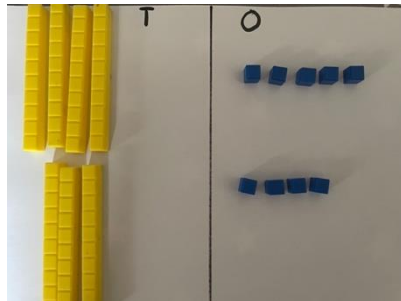


Written Method

Adding a 2 digit number to a 2 digit number without exchange.
(Place value)

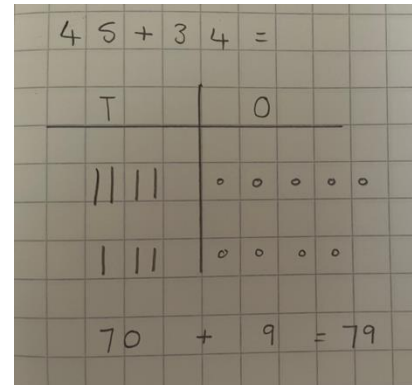
Use denes or pv counters or even arrow cards

45 + 34 =



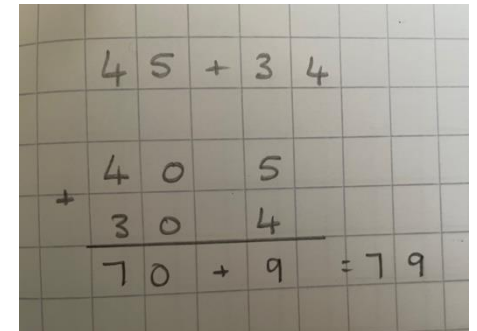
70 + 9 = 79

45 + 34 =



It is helpful if the children draw their ones in 5s.

45 + 34



This is an extension to the Year 2 objective. If children are not able to understand this but can do the pictorial method that is fine.



Written method

Adding a 2 digit number and 2 digit number where the ones make 10 (introduce exchange)

Use denes or pv counters or even arrow cards

Spend time doing this practically with children physically exchanging the tens and ones.

$53 + 27 =$

$80 + 0 = 80$

$53 + 27 =$

Please ensure that the children carry the ten above the tens that are already in the tens column

$53 + 27 =$

Please ensure that the children carry the ten above the tens that are already in the tens column
This is an extension to the Year 2 objective. If children are not able to understand this but can do the pictorial method that is fine.

Complete written method

Adding a 2 digit number and a 2 digit number where the ones go over 10 (exchange)

$53 + 39 =$

$90 + 3 = 93$


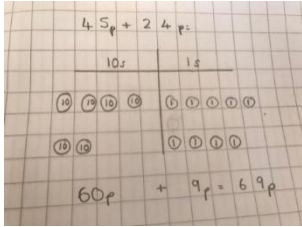
$53 + 39 =$

Please ensure that the children carry the ten above the tens that are already in the tens column

$53 + 39 =$

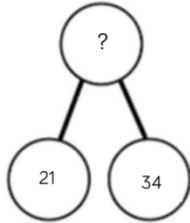
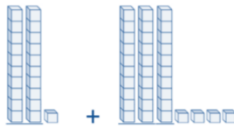









Please ensure that the children carry the ten above the tens that are already in the tens column



			This is an extension to the Year 2 objective. If children are not able to understand this but can do the pictorial method that is fine.
Extend to adding money amounts below £1	Use coins rather than denes $45p + 24p =$  $60 + 9 = 69$	$45p + 24p =$ 	As above

All methods throughout the year groups should be applied to calculations presented in different ways, through pictorial models, reasoning and problem solving. For example:

Conceptual variation; different ways to ask children to solve $21 + 34$

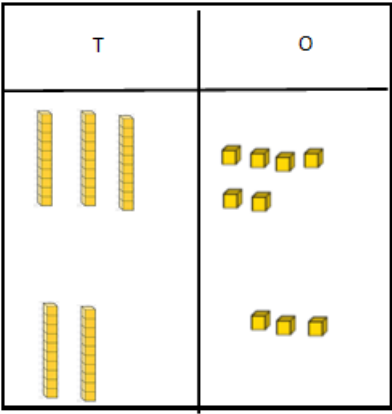
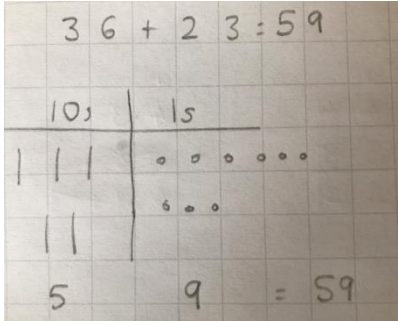
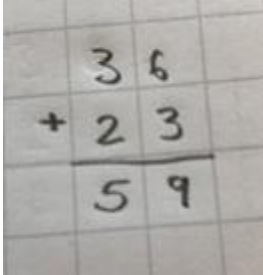
 <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">?</td> </tr> <tr> <td style="text-align: center;">21</td> <td style="text-align: center;">34</td> </tr> </table>	?		21	34	<p>Word problems: In year 3, there are 21 children and in year 4, there are 34 children. How many children in total?</p> <p>$21 + 34 = 55$. Prove it</p>	$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$ <p>$21 + 34 =$</p> <div style="border: 1px dashed black; display: inline-block; width: 20px; height: 20px; vertical-align: middle;"></div> $= 21 + 34$ <p>Calculate the sum of twenty-one and thirty-four.</p>	 <p>Missing digit problems:</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <th style="background-color: #f28b82;">10s</th> <th style="background-color: #f28b82;">1s</th> </tr> <tr> <td style="text-align: center;">  </td> <td style="text-align: center;">  </td> </tr> <tr> <td style="text-align: center;">  </td> <td style="text-align: center;">?</td> </tr> <tr> <td style="text-align: center;">?</td> <td style="text-align: center;">5</td> </tr> </table>	10s	1s				?	?	5
?															
21	34														
10s	1s														
															
	?														
?	5														



Written Calculation Policy Overview

Addition- Year 3

Please note that the concrete and pictorial methods are stepping stones to the abstract and used to explain the concept of the exchange and carry. It may be that these are only needed to begin with while the children are learning how the method works. The concrete does not need to be recorded. Where children are confident they may move on to the abstract quickly. Children should revise methods from Year 2 as needed.

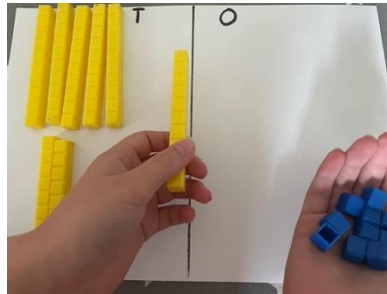
Objective	Concrete (This does not need to be recorded in books it can be done practically alongside the abstract)	Pictorial (This should be shown in books to start with but many only be needed when learning the method-move to abstract when children have an understanding of the method. Please only draw lines and circles. To speed it up give children outline grids for them to complete.)	Abstract (You DO NOT need lines or headings)
<p>Add 2 digit numbers without regrouping</p> <p>Children should be shown how the expanded method condenses into the formal method. They will need to be taught how to line up the digits correctly and how to use the language of 2 tens rather than 20.</p>	<p>$36 + 23 = 59$</p>  <p>5 tens + 9 ones = 59</p>		<p>$36 + 23 = 59$</p>  <p>5 tens + 9 ones =</p>



Adding a 2 digit number and 2 digit number where the ones make 10 (introduce exchange)

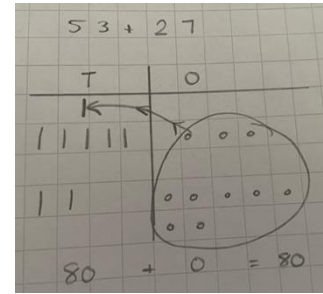
This does not necessarily need to be a whole lesson or group of lessons. Just revise as part of teaching in 4 a day and also at the start of the new teaching.

$$53 + 27 =$$



$$80 + 0 = 80$$

$$53 + 27 =$$



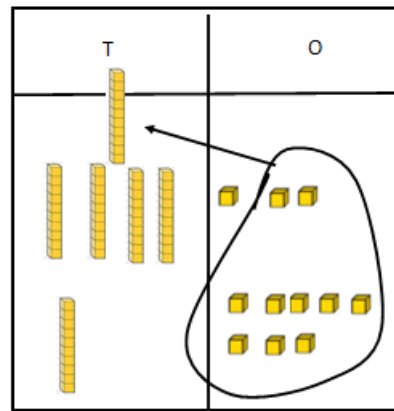
Please ensure that the children carry the ten above the tens that are already in the tens column

$$53 + 27 =$$

Please ensure that the children carry the ten above the tens that are already in the tens column

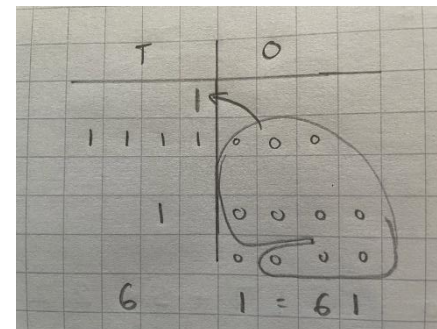
Add 2 2 digit numbers where the ones go over 10.

$$43 + 18 =$$

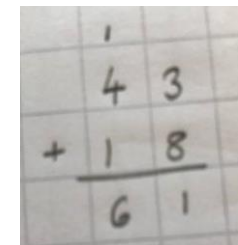


$$6 \text{ tens and } 1 \text{ ones} = 61$$

$$43 + 18 =$$



$$43 + 18 = 61$$

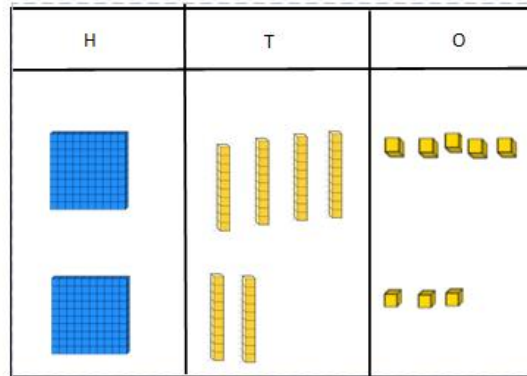




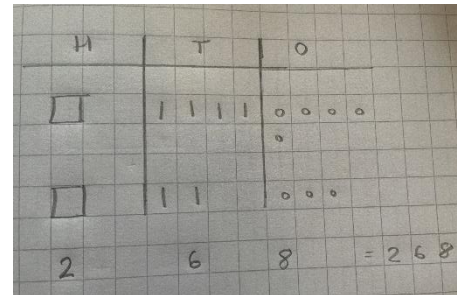
Add two 3 digit numbers without regrouping.

This can be explored with denes or place value counters.

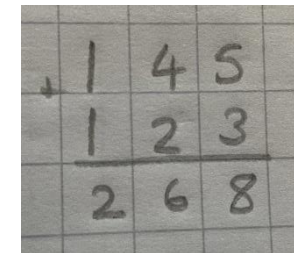
$145 + 123 =$



$145 + 123 =$



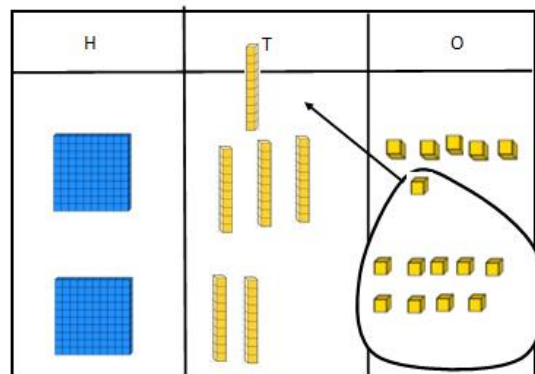
$145 + 123 =$



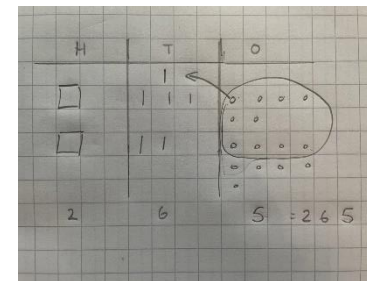
Add 3 digit and 3 digit number with an exchange in ones.

This can be explored with denes or place value counters.

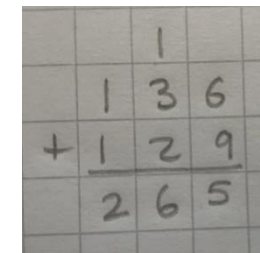
$136 + 129 =$



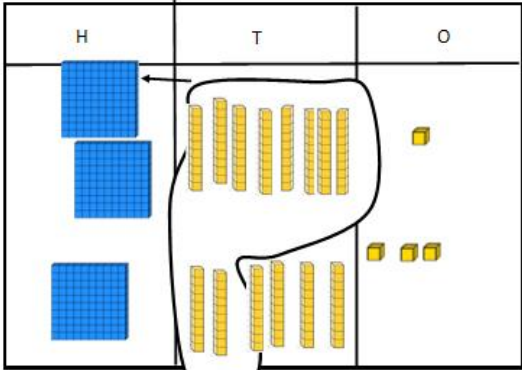
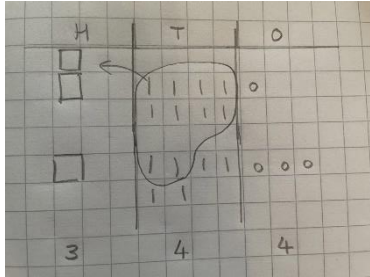
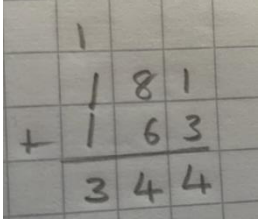
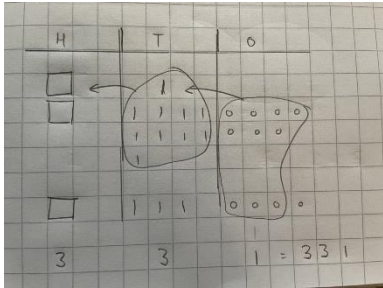
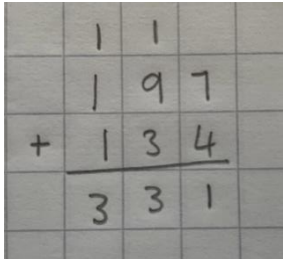
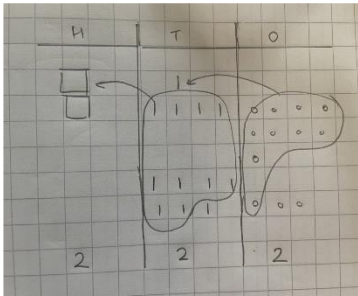
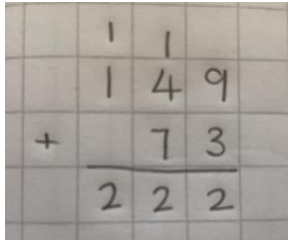
$136 + 129 =$



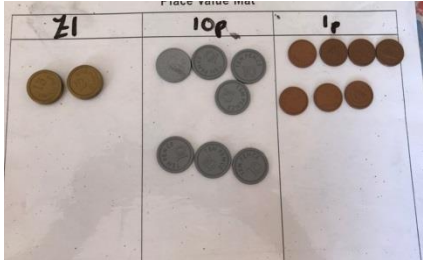
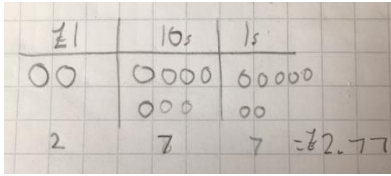
$136 + 129 =$





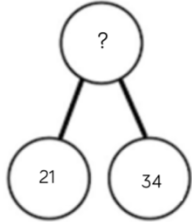
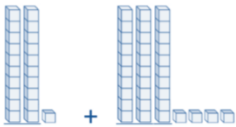
<p>Add 3 digit number and 3 digit number with exchange the in tens,</p> <p>This can be explored with denes or place value counters.</p>	<p>$181 + 163 =$</p> 	<p>$181 + 163 =$</p> 	<p>$181 + 163 =$</p> 
<p>Add 3 digit number and 3 digit number with the exchange in the tens and ones.</p> <p>This can be explored with denes or place value counters.</p>	<p>$197 + 134 =$</p> <p>As above with two exchanges Only if needed.</p>	<p>$197 + 134 =$</p> 	<p>$197 + 134 =$</p> 
<p>Add a 3 digit number and 2 digit number with varied exchanges.</p> <p>This can be explored with denes or place value counters.</p>	<p>$149 + 73 =$</p> <p>As above with two exchanges. Only if needed.</p>	<p>$149 + 73 =$</p> 	<p>$149 + 73 =$</p> 



<p>This can be extended to adding money amounts Use coins rather than denes</p>	<p>£1.45 + £1.32 =</p> 	<p>As above with circles rather than denes.</p> 	<p>As above. Children should NOT record £ and p in the method.</p>
---	--	---	--

All methods throughout the year groups should be applied to calculations presented in different ways, through pictorial models, reasoning and problem solving. For example:

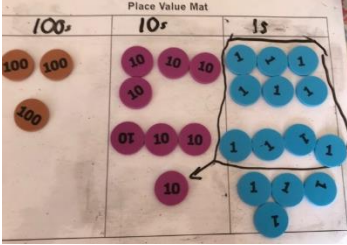
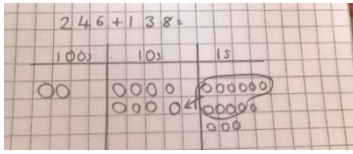
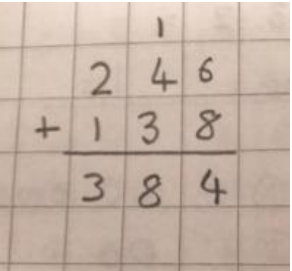
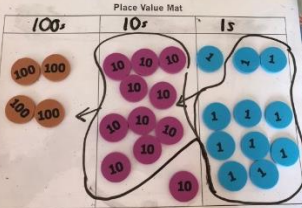
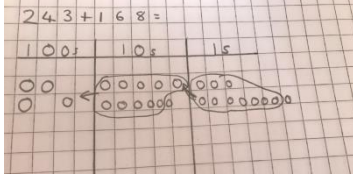
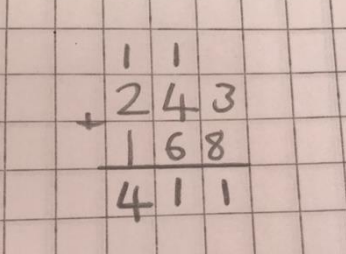
Conceptual variation; different ways to ask children to solve 21 + 34

 <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;">?</td></tr> <tr><td style="text-align: center;">21</td><td style="text-align: center;">34</td></tr> </table>	?		21	34	<p>Word problems: In year 3, there are 21 children and in year 4, there are 34 children. How many children in total?</p> <p>21 + 34 = 55. Prove it</p>	$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$ <p>21 + 34 =</p> <p> = 21 + 34</p> <p>Calculate the sum of twenty-one and thirty-four.</p>	 <p>Missing digit problems:</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <tr style="background-color: #f8d7da;"><th>10s</th><th>1s</th></tr> <tr><td>10 10</td><td>1</td></tr> <tr><td>10 10 10</td><td>?</td></tr> <tr><td>?</td><td>5</td></tr> </table>	10s	1s	10 10	1	10 10 10	?	?	5
?															
21	34														
10s	1s														
10 10	1														
10 10 10	?														
?	5														



Written Calculation Policy Overview

Addition- Year Four

Objective	Concrete	Pictorial	Abstract
<p>Adding a 3 digit number and a 3 digit number (with exchange (Written Method))</p> <p>Adding 2 4 digit numbers in the same way.</p>	<p>Review from Year 3 using the language of hundreds and tens and ones. Introduce PV counters (compare to denes)</p> <p>$246 + 138 =$</p>  <p>3 hundreds 8 tens 4 ones = 384</p>	<p>$246 + 138 =$</p>  <p>3 8 4</p>	
<p>To add 2 , 3 digit or 4 digit numbers with multiple exchange.</p>	<p>$243 + 168 =$</p>  <p>4 hundreds 1 ten 1 one = 411</p>	<p>$243 + 168 =$</p>  <p>4 1 1 = 411</p>	



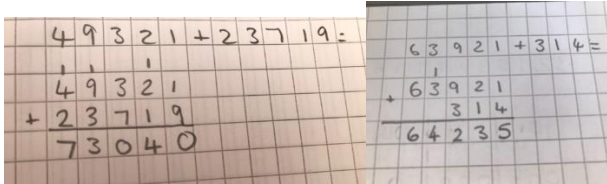
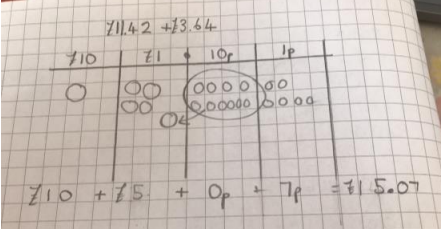
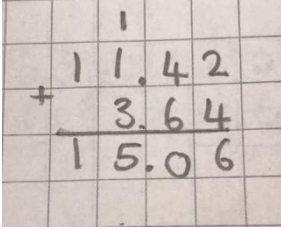
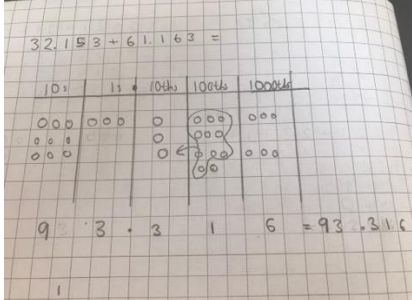
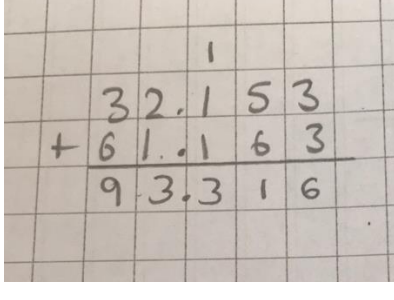
Caversham Park Primary School Calculation Policy

<p>To add decimals with 2 decimal places.</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">1s</td> <td style="width: 25%;">10ths</td> <td style="width: 25%;">100ths</td> <td style="width: 25%;"></td> </tr> <tr> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;">●</td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> </tr> <tr> <td style="border-bottom: 1px solid black;"> </td> <td style="border-bottom: 1px solid black;">●</td> <td style="border-bottom: 1px solid black;"> </td> <td style="border-bottom: 1px solid black;"> </td> </tr> </table>	1s	10ths	100ths			●				●				<p>2.31 + 1.67 =</p>												
1s	10ths	100ths																									
	●																										
	●																										
<p>To add 2, 4 digit numbers using formal methods</p>	<p>As above with 4 digits if needed.</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">10s</td> <td style="width: 25%;">1s</td> <td style="width: 25%;">10ths</td> <td style="width: 25%;">100ths</td> </tr> <tr> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;">●</td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> </tr> <tr> <td style="border-bottom: 1px solid black;"> </td> <td style="border-bottom: 1px solid black;"> </td> <td style="border-bottom: 1px solid black;">●</td> <td style="border-bottom: 1px solid black;"> </td> </tr> </table> <p>Extend to money amounts using coins if needed. As below:</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 25%;">£10</td> <td style="width: 25%;">£1</td> <td style="width: 25%;">10p</td> <td style="width: 25%;">1p</td> </tr> <tr> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;">●</td> <td style="border-top: 1px solid black; border-bottom: 1px solid black;"> </td> </tr> <tr> <td style="border-bottom: 1px solid black;"> </td> <td style="border-bottom: 1px solid black;"> </td> <td style="border-bottom: 1px solid black;">●</td> <td style="border-bottom: 1px solid black;"> </td> </tr> </table>	10s	1s	10ths	100ths			●				●		£10	£1	10p	1p			●				●		<p>As above with 4 digits if needed</p>	<p>£11.42 + 3.64 =</p>
10s	1s	10ths	100ths																								
		●																									
		●																									
£10	£1	10p	1p																								
		●																									
		●																									

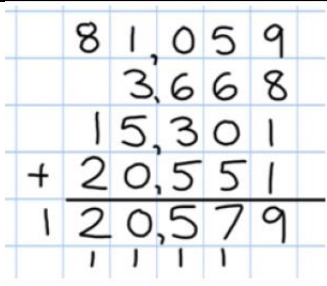


Written Calculation Policy Overview

Addition- Year Five and Six

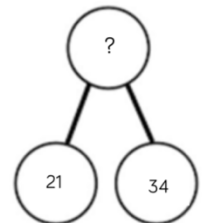
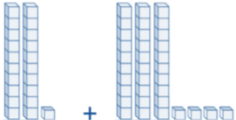
Objective	Concrete	Pictorial	Abstract										
<p>To add numbers with more than 4 digits.</p> <p>To add numbers which involve multiple exchange</p>	<p>By this stage the children should understand enough to extend their abstract methods (presuming their place value to 1 million is solid) Where they struggle you can go back to concrete and extend to:</p> <table border="1" data-bbox="517 576 996 651"> <tr> <td>10000s</td> <td>1000s</td> <td>100s</td> <td>10s</td> <td>1s</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	10000s	1000s	100s	10s	1s						<p>As Year 4</p>	 <p>Children show add numbers with multiple exchange and also different numbers of digits. They should be encouraged to estimate and check.</p>
10000s	1000s	100s	10s	1s									
<p>To add money amounts</p>	<p>As below:</p> <table border="1" data-bbox="517 759 996 874"> <tr> <td>£10</td> <td>£1</td> <td>10p</td> <td>1p</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	£10	£1	10p	1p								
£10	£1	10p	1p										
<p>To add decimals with 2 and 3 digits.</p>	<table border="1" data-bbox="517 927 996 1002"> <tr> <td>10s</td> <td>1s</td> <td>10ths</td> <td>100ths</td> <td>1000ths</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>Use decimal place value counters to explore the exchange</p>	10s	1s	10ths	100ths	1000ths							
10s	1s	10ths	100ths	1000ths									



<p>To add several numbers including decimals.</p>	<p>By this stage the children should understand enough to extend their abstract methods (presuming their place value to 1 million is solid) Where they struggle you can go back to concrete and extend to:</p> <table border="1" data-bbox="515 406 996 478"> <tr> <td>10000s</td> <td>1000s</td> <td>100s</td> <td>10s</td> <td>1s</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	10000s	1000s	100s	10s	1s						<p>As above</p>	
10000s	1000s	100s	10s	1s									


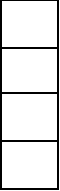

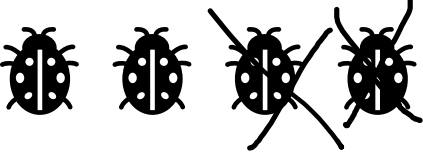


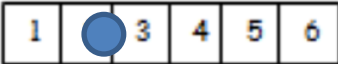

All methods throughout the year groups should be applied to calculations presented in different ways, through pictorial models, reasoning and problem solving. For example:

Conceptual variation; different ways to ask children to solve 21 + 34

 <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td colspan="2" style="text-align: center;">?</td> </tr> <tr> <td style="text-align: center;">21</td> <td style="text-align: center;">34</td> </tr> </table>	?		21	34	<p>Word problems: In year 3, there are 21 children and in year 4, there are 34 children. How many children in total?</p> <p>$21 + 34 = 55$. Prove it</p>	$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$ <p>$21 + 34 =$</p> <div style="border: 1px dashed black; display: inline-block; width: 20px; height: 20px; vertical-align: middle;"></div> $= 21 + 34$ <p>Calculate the sum of twenty-one and thirty-four.</p>	 <p>Missing digit problems:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <th style="background-color: #f28b82;">10s</th> <th style="background-color: #f28b82;">1s</th> </tr> <tr> <td style="text-align: center;">10 10</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">10 10 10</td> <td style="text-align: center;">?</td> </tr> <tr> <td style="text-align: center;">?</td> <td style="text-align: center;">5</td> </tr> </table>	10s	1s	10 10	1	10 10 10	?	?	5
?															
21	34														
10s	1s														
10 10	1														
10 10 10	?														
?	5														



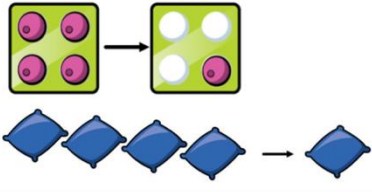
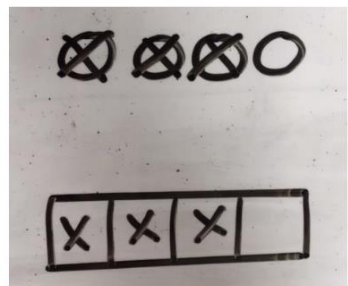

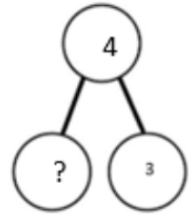


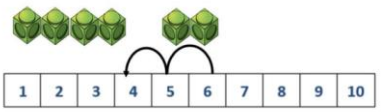
Subtraction - Reception

Objective	Concrete	Pictorial	Abstract
<p>To subtract by taking away objects and counting what is left.</p> <p>To subtract single-digit numbers and count back to find the answer.</p>	<p>Children use a range of practical resources to subtract by taking away and counting how much is left.</p> <p>These may include objects (e.g. animals), cubes, counters, numicon, fingers, bead strings and much more!</p>    <p>5 - 1 = 4</p> <p>Use bead strings to count back</p>	<p>Children draw pictures of objects and then cross out to take away.</p> <p>4 - 2 = 2</p> 	<p>Children use given number lines to count back. This may include using objects like cubes, plasticine or counters to keep the place.</p> <p>6 - 4 = 2</p>  <p>Solve problems using counting back on fingers e.g. 5 animals run away. How many are left?</p>
<p>To find one less than a given number</p>	<p>Children use practical objects and resource such as multilink to find 1 less</p> <p>Bead strings can also be used</p> 	<p>Numicon/ Number tracks can be used to find one less. Place counter on a given number. What is 1 less</p>  	<p>Number lines can be used to find 1 less than a number,</p>



Written Calculation Policy Overview

Subtraction- Year One

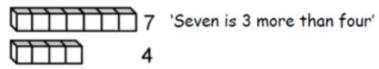
Objective	Concrete	Pictorial	Abstract				
<p>To subtract using physical objects</p>	<p>Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used).</p> <p>$4 - 3 = 1$</p> 	<p>Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.</p> 	<p>$4 - 3 =$</p> <p> $= 4 - 3$</p> <table border="1" data-bbox="1612 534 1915 606"> <tr><td colspan="2">4</td></tr> <tr><td>3</td><td>?</td></tr> </table> 	4		3	?
4							
3	?						
<p>To subtract by counting back</p>	 <p>Move objects away from the group, counting backwards.</p> <p>Move the beads along the bead string as you count backwards.</p> 	<p>Counting back (using number lines or number tracks) children start with 6 and count back 2.</p> <p>$6 - 2 = 4$</p> 	<p>Place the larger number in your head and count back.</p> <p>$16 - 4 =$</p>				



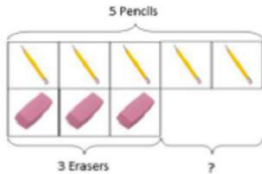
Caversham Park Primary School Calculation Policy

To find the difference

Compare objects and amounts

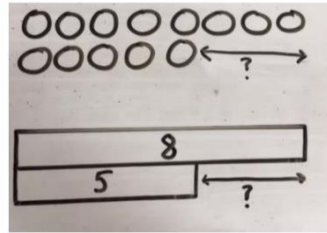


'I am 2 years older than my sister'



Lay objects to represent bar model.

Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.



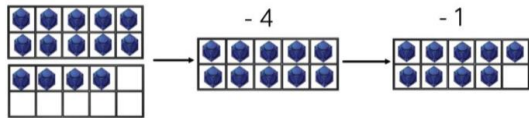
Find the difference between 8 and 5.

8 - 5, the difference is

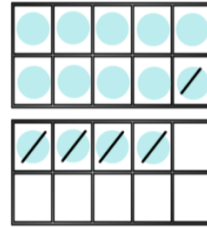
Children to explore why
 $9 - 6 = 8 - 5 = 7 - 4$ have the same difference.

To make to subtract across boundaries

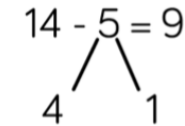
Making 10 using ten frames.
 $14 - 5$



Children to present the ten frame pictorially and discuss what they did to make 10.

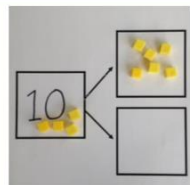


Children to show how they can make 10 by partitioning the subtrahend.



$$14 - 4 = 10$$
$$10 - 1 = 9$$

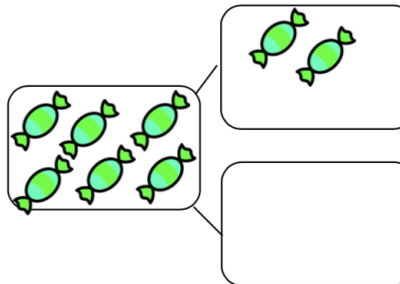
To recognise and use number bonds within 20



Link to addition. Use PPW model to model the inverse.

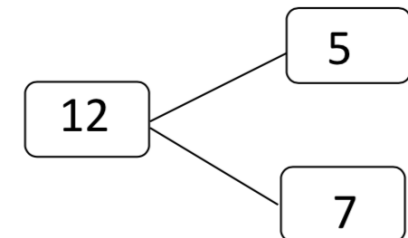
If 10 is the whole and 6 is one of the parts, what is the other part?

$$10 - 6 = 4$$



Use pictorial representations to show the part.

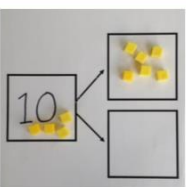
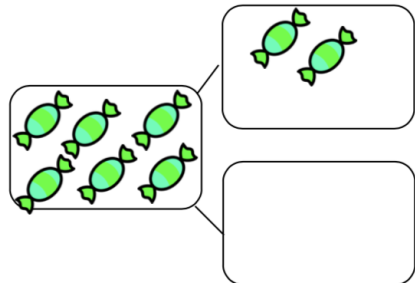
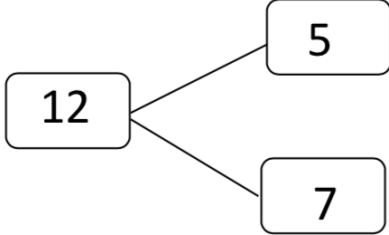

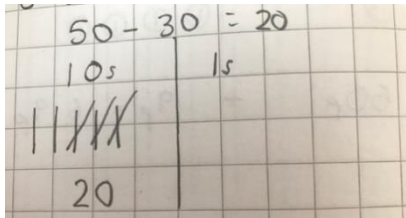
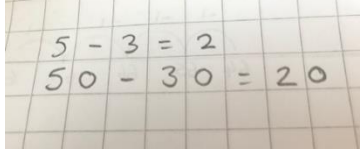
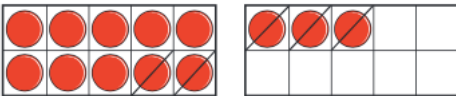
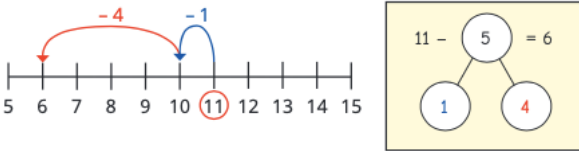
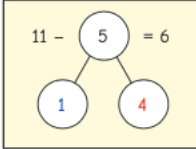
Move to using numbers within the part whole model.





Written Calculation Policy Overview

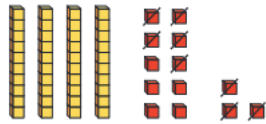
Subtraction - Year Two

Objective	Concrete	Pictorial	Abstract
<p>To recognise and use number bonds within 20</p> <p>(Continue from year 1)</p>	 <p>Link to addition. Use PPW model to model the inverse.</p> <p>If 10 is the whole and 6 is one of the parts, what is the other part?</p> <p>$10 - 6 = 4$</p>	 <p>Use pictorial representations to show the part.</p>	<p>Move to using numbers within the part whole model.</p> 
<p>Subtract 2 multiples of 10 using number facts.</p>	<p>Using denes subtract tens and relate to number bonds</p> <p>$70 - 30 = 40$ because 7 sticks - 3 sticks is 4 sticks</p> 		<p>Relate number bonds to multiples of 10</p> 
<p>To bridge through 10 to subtract</p>	<p>Explore using part whole models</p> <p>Making 10</p> <p>$13 - 5 =$</p> 	<p>Explore drawing denes pictorially or using a numberline to pass through 10.</p> 	<p>Use part whole model to assist</p> 



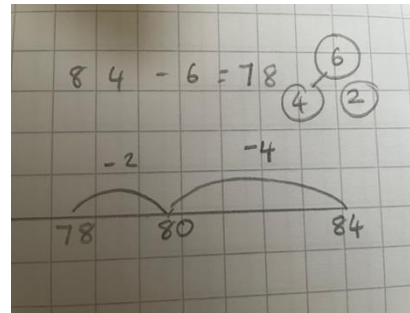
Caversham Park Primary School Calculation Policy

To bridge across a 10 to subtract a 1 digit number from a 2 digit number

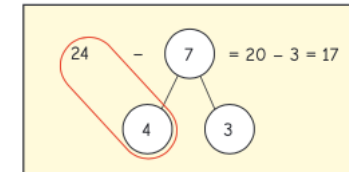


Explore subtractin by exchanging a ten for ten ones and then taking away,

Use a numberline to work out the subtractions - part whole model to assist.

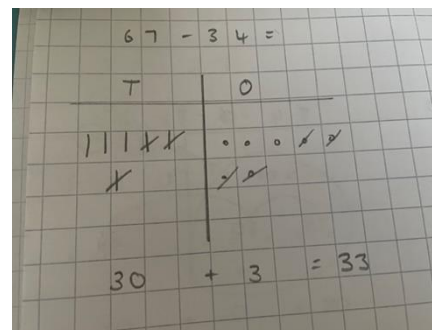
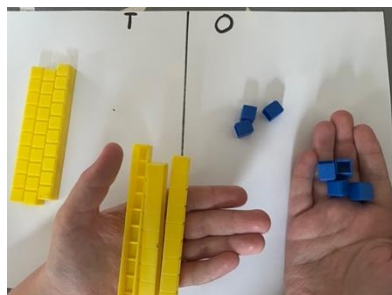


Explore using part whole models if able.

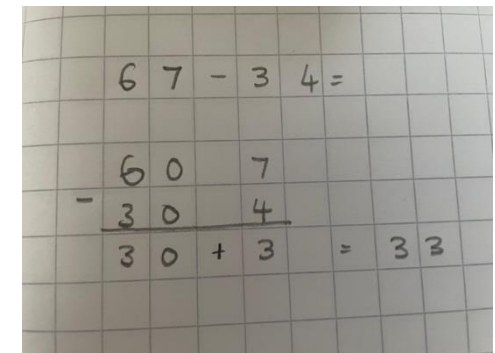


To subtract 2 2 digit numbers with no exchange.

$$67 - 34 =$$



Please encourage children to cross out the ones first.

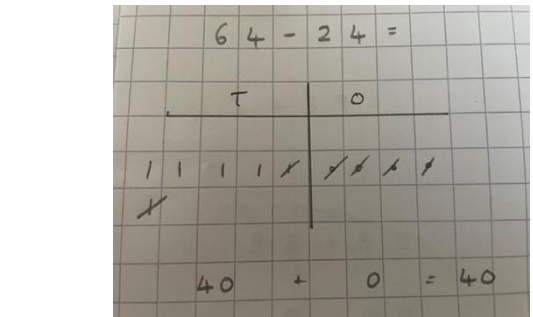
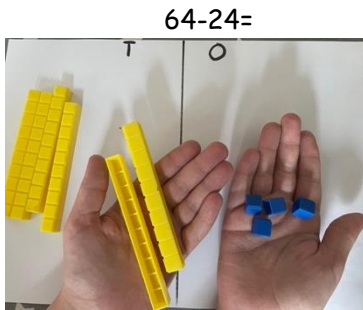


Please encourage children to subtract the ones first.

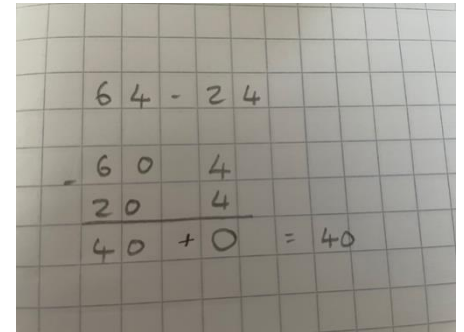
This is an extension to the Year 2 objective. If children are not able to understand this but can do the pictorial method that is fine.



To subtract 2 2 digit numbers where there are no ones (introduce exchange)



Please encourage children to cross out the ones first.

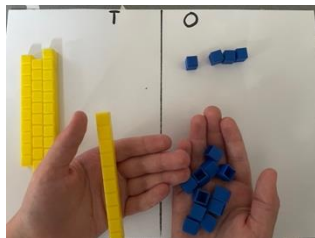


Please encourage children to subtract the ones first.

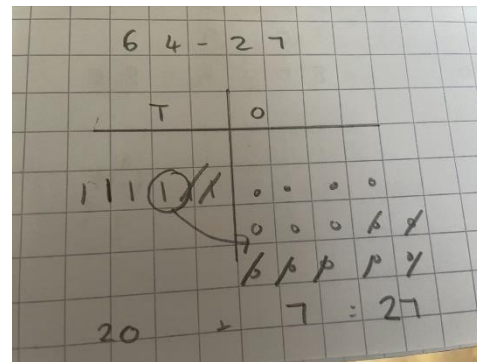
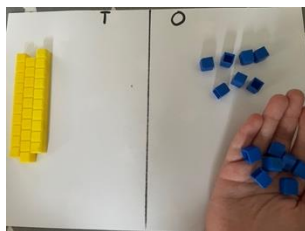
This is an extension to the Year 2 objective. If children are not able to understand this but can do the pictorial method that is fine.

To subtract 2 2 digit numbers where there is an exchange.

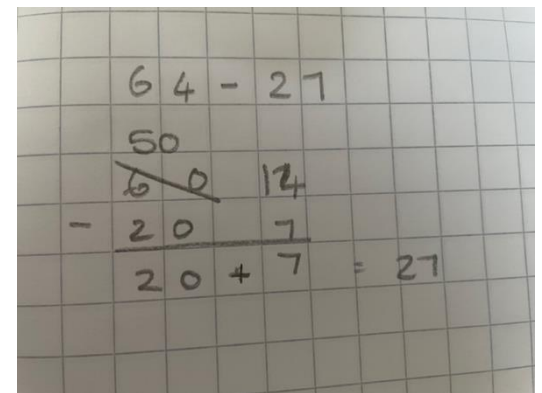
64 - 27
Children subtract the tens and then exchange 1 ten for 10 ones.



Children then subtract the ones.



Please encourage children to subtract the ones first.

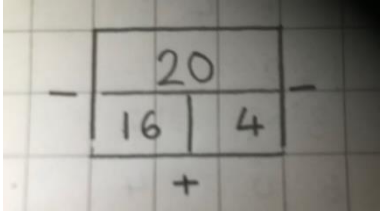


Please encourage children to subtract the ones first.

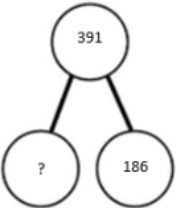
This is an extension to the Year 2 objective. If children are not able to understand this but can do the pictorial method that is fine.



Caversham Park Primary School Calculation Policy

<p>To explore inverse</p>	<p>Use counters to explore what happens when you split a group of objects and put them back together again. Does the number of objects /counters change?</p>	<p>Show in pictures the relationship between adding and taking away.</p>	<p>Use inverse grid to create inverse calculations and solve missing number problems.</p> 
---------------------------	--	--	---

Conceptual variation; different ways to ask children to solve 391 - 186

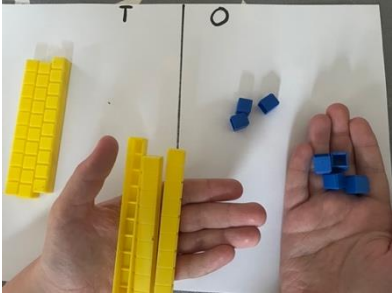
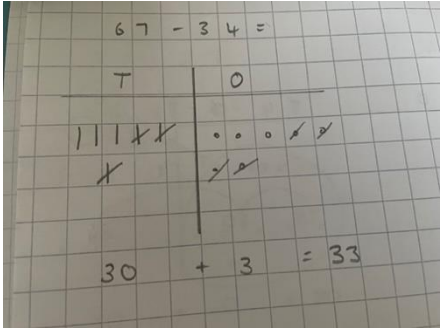
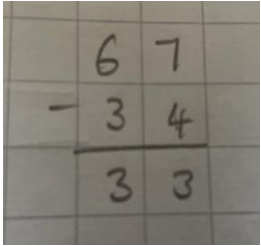
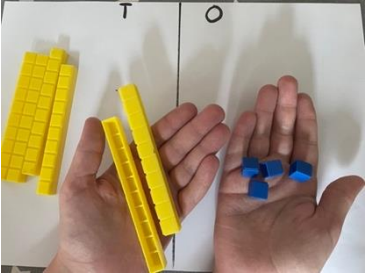
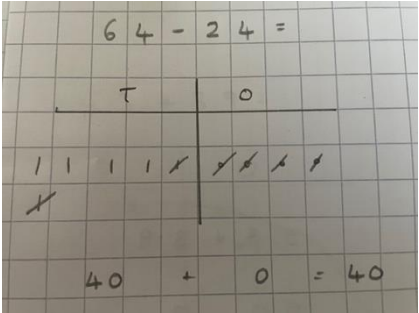
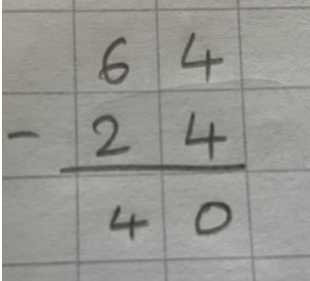
 <table border="1" data-bbox="107 1018 622 1125"> <tr> <td colspan="2">391</td> </tr> <tr> <td>186</td> <td>?</td> </tr> </table>	391		186	?	<p>Raj spent £391, Timmy spent £186. How much more did Raj spend?</p> <p>Calculate the difference between 391 and 186.</p>	<p><input type="text"/> = 391 - 186</p> $\begin{array}{r} 391 \\ -186 \\ \hline \end{array}$ <p>What is 186 less than 391?</p>	<p>Missing digit calculations</p> $\begin{array}{r} 39\Box \\ -\Box\Box6 \\ \hline \Box05 \end{array}$
391							
186	?						



Written Calculation Policy Overview

Subtraction- Year Three

Please note that the concrete and pictorial methods are stepping stones to the abstract and used to explain the concept of the exchange and carry. It may be that these are only needed to begin with while the children are learning how the method works. The concrete does not need to be recorded. Where children are confident they may move on to the abstract quickly.

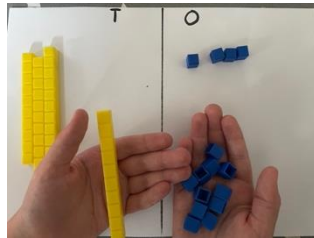
Objective	Concrete (This does not need to be recorded in books it can be done practically alongside the abstract)	Pictorial (This should be shown in books to start with but many only be needed when learning the method- move to abstract when children have an understanding of the method. Please only draw lines and circles. Children can be given outline grids to complete.)	Abstract (You DO NOT need lines or headings)
To subtract 2 2 digit numbers with no exchange.	<p style="text-align: center;">$67 - 34 =$</p> 	 <p>Please encourage children to cross out the ones first.</p>	
.To subtract 2 2 digit numbers where there are no ones (introduce exchange)	<p style="text-align: center;">$64 - 24 =$</p> 	 <p>Please encourage children to cross out the ones first.</p>	



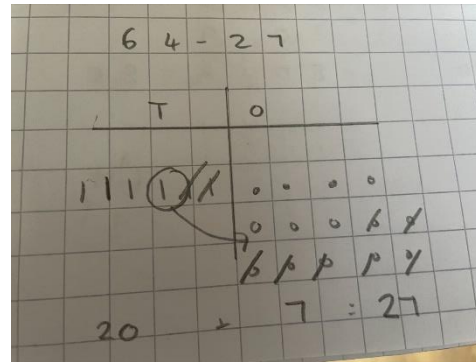
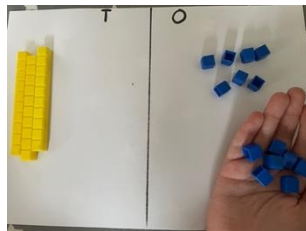
To subtract 2 2 digit numbers where there is an exchange.

$$64 - 27$$

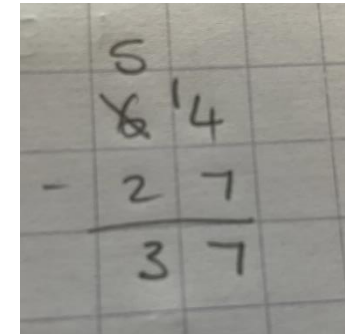
Children subtract the tens and then exchange 1 ten for 10 ones.



Children then subtract the ones.



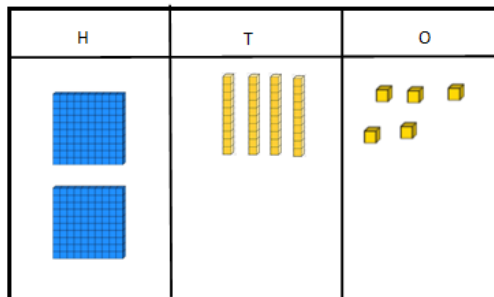
Please encourage children to subtract the ones first.



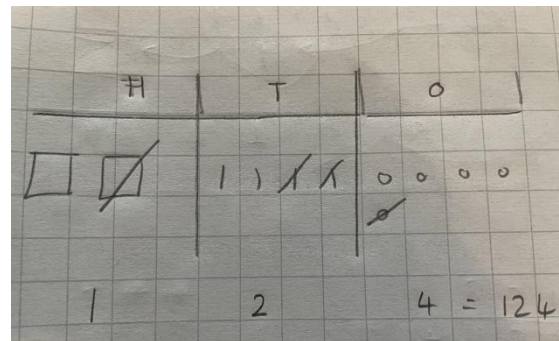
To subtract 2 3 digit numbers without exchange.

$$245 - 121 =$$

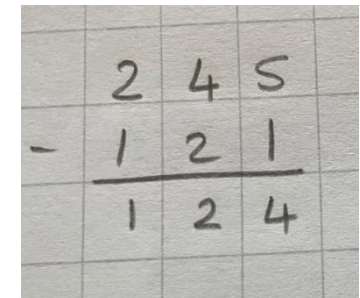
Children remove 1 hundred, 2 tens and 4 ones.



$$245 - 121 =$$



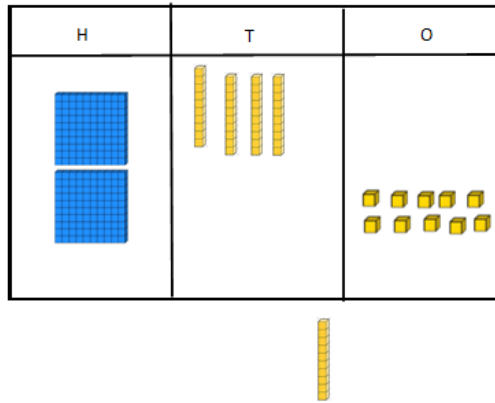
$$245 - 121 =$$





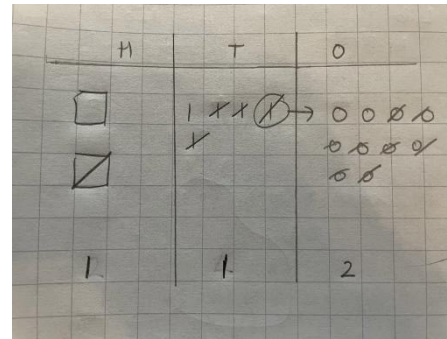
To subtract 2 3 digit numbers where there are no ones.

$250 - 138 =$

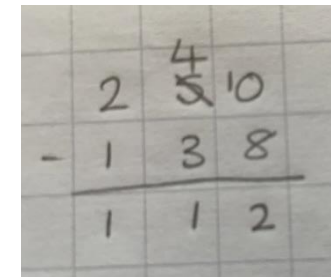


Children exchange 1 ten for 10 ones and then subtract as above.

$250 - 138 =$



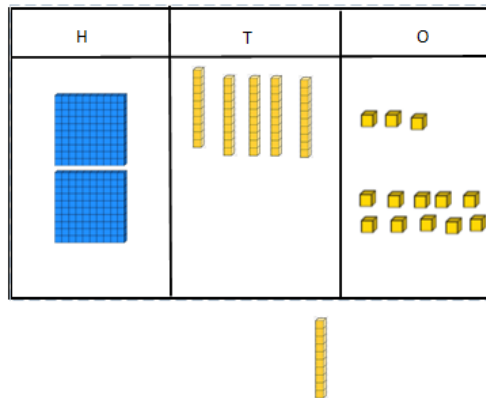
$250 - 138 =$



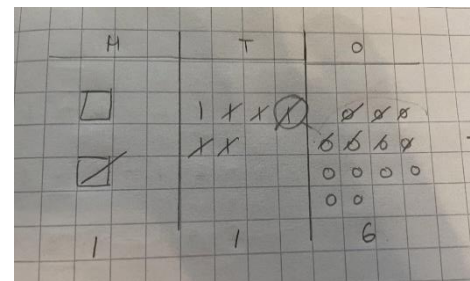
To subtract a 3 digit number with an exchange in the ones,

$263 - 147 =$

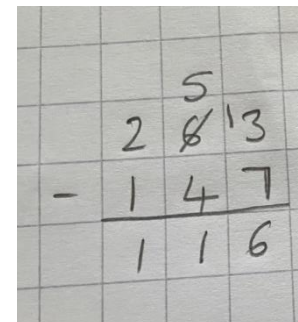
Children exchange 1 ten for 10 ones and then subtract



$263 - 147 =$



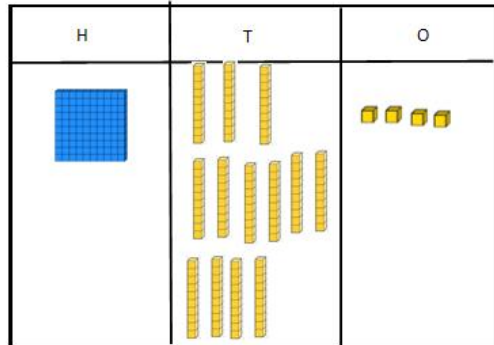
$263 - 147 =$



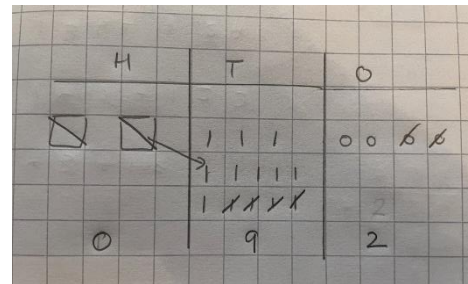


To subtract 2 3 digit numbers with an exchange in the tens.

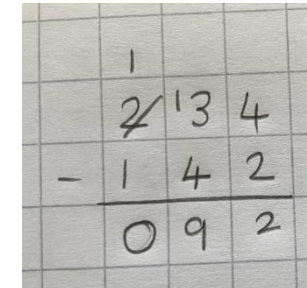
234 - 142 =
Children exchange 1 hundred for 10 tens and then subtract.



234 - 142 =



234 - 142 =

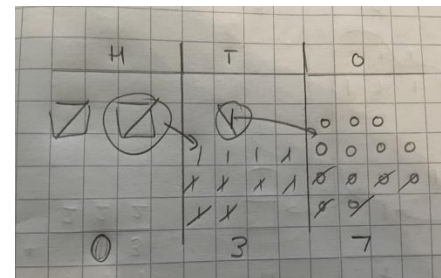


To subtract 2 3 digit numbers with more than 1 exchange.

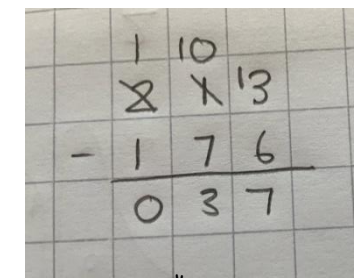
213 - 176 =
Children complete both exchanges and then subtract.

As above if needed

213 - 176 =



213 - 176 =

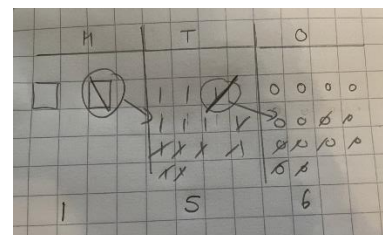


To subtract a 2 digit number from a 3 digit number with varied exchange.

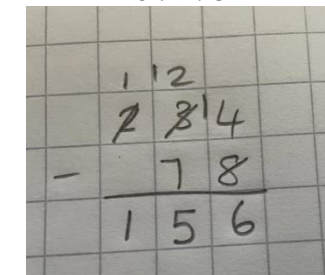
234 - 78 =
Children complete both exchanges and then subtract.

As above if needed

234 - 78 =



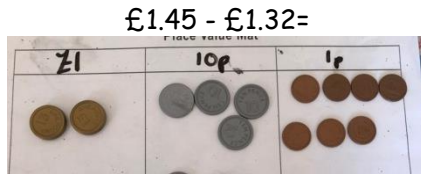
234 - 78 =





Caversham Park Primary School Calculation Policy

This can be extended to adding money amounts
Use coins rather than denes

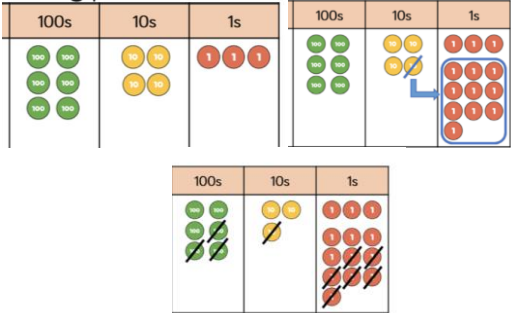
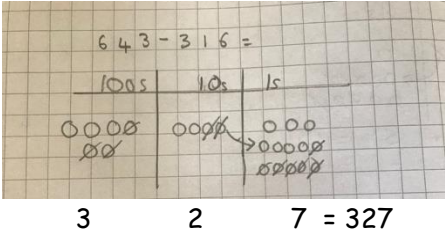
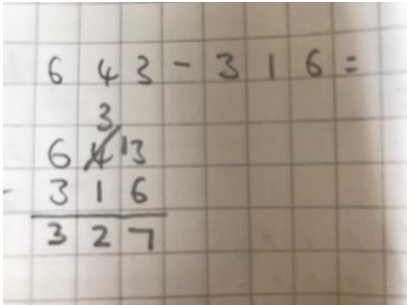
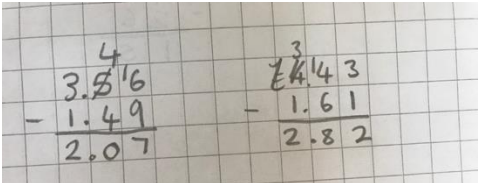


As above with circles rather than denes.

As above. Children should NOT record £ and p in the method.



Subtraction- Year Four

Objective	Concrete	Pictorial	Abstract												
<p>To subtract 2 3 digit numbers using formal method.</p>	<p>Review Year 3 using pv counters with 1 exchange. Ensure using language of hundreds, tens and ones.</p> <p>643- 316=327</p> 														
<p>To subtract 2 4 digit numbers</p>	<p>As above but with 4 digit numbers. Begin with 1 exchange and then multiple exchange</p> <p>By this point some children will not need to do the concrete or pictorial- they will be able to apply their pv understanding.</p>	<p>As above but with 4 digit numbers. Begin with 1 exchange and then multiple exchange</p>	<p>As above but with 4 digit numbers. Begin with 1 exchange and then multiple exchange</p>												
<p>To subtract decimals with 2 decimal places (apply to money)</p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;">1s</td> <td style="width: 33%;">10ths</td> <td style="width: 33%;">100ths</td> </tr> <tr> <td>•</td> <td>•</td> <td></td> </tr> </table> <p>Extend to money amounts using coins if needed. As below:</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;">£1</td> <td style="width: 33%;">10p</td> <td style="width: 33%;">1p</td> </tr> <tr> <td>•</td> <td>•</td> <td>•</td> </tr> </table>	1s	10ths	100ths	•	•		£1	10p	1p	•	•	•	<p>As above</p>	
1s	10ths	100ths													
•	•														
£1	10p	1p													
•	•	•													

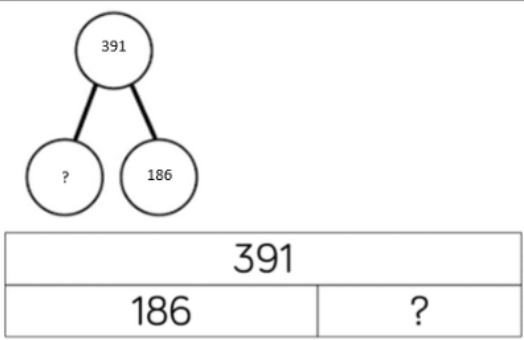


Subtraction - Year 5 and 6

Objective	Concrete	Pictorial	Abstract
<p>To subtract numbers with more than 4 digits</p>	<p>By this point children should have a good understanding of the column subtraction method and may not need to model with concrete or pictorial methods.</p> <p>If they do then they apply methods from Year 4 to numbers beyond 4 digits.</p> <p>Children should be taught to subtract numbers with different numbers of digits.</p>	<p>As Year 4 if needed.</p>	$\begin{array}{r} \overset{2}{\cancel{2}} \overset{10}{\cancel{1}} \overset{0}{\cancel{0}} \overset{8}{\cancel{8}} \overset{6}{\cancel{6}} \\ - \quad \quad 2128 \\ \hline 28,928 \end{array}$ <p>Apply to measures and money</p>
<p>To subtract numbers with up to 3 decimal places</p>		<p>As Year 4 if needed</p>	$\begin{array}{r} \overset{6}{\cancel{7}} \overset{10}{\cancel{1}} \overset{6}{\cancel{6}} \overset{8}{\cancel{8}} \overset{0}{\cancel{0}} \\ - \quad \quad 372.5 \\ \hline 6796.5 \end{array}$ <p>Apply abstract methods to measures and money.</p>
<p>(Year 6) To subtract with increasingly large and more complex numbers and decimal values.</p>		<p>As Year 4 if needed.</p>	$\begin{array}{r} \overset{1}{\cancel{1}} \overset{8}{\cancel{8}} \overset{10}{\cancel{0}} \overset{6}{\cancel{6}} \overset{9}{\cancel{9}} \\ - \quad \quad 89,949 \\ \hline 60,750 \end{array}$ $\begin{array}{r} \overset{1}{\cancel{1}} \overset{10}{\cancel{0}} \overset{5}{\cancel{5}} \overset{3}{\cancel{3}} \overset{1}{\cancel{1}} \overset{9}{\cancel{9}} \text{ kg} \\ - \quad \quad 36.08 \text{ kg} \\ \hline 69.33 \text{ kg} \end{array}$ <p>Apply abstract methods to measures and money</p>



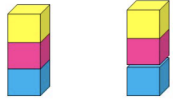





At all stages children should be given opportunities to apply their methods to different visual models, reasoning and problem solving activities. For example:

Conceptual variation; different ways to ask children to solve $391 - 186$			
 <p>A tree diagram with 391 at the top, branching down to a circle with '?' and a circle with 186. Below it is a bar model with 391 in the top bar and 186 in the bottom left bar, with a '?' in the bottom right bar.</p>	<p>Raj spent £391, Timmy spent £186. How much more did Raj spend?</p> <p>Calculate the difference between 391 and 186.</p>	<p>$\square = 391 - 186$</p> $\begin{array}{r} 391 \\ -186 \\ \hline \end{array}$ <p>What is 186 less than 391?</p>	<p>Missing digit calculations</p> $\begin{array}{r} 39\square \\ -\square\square 6 \\ \hline \square 0 5 \end{array}$



Written Calculation Policy Overview

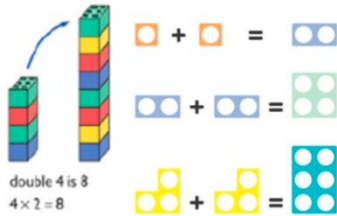

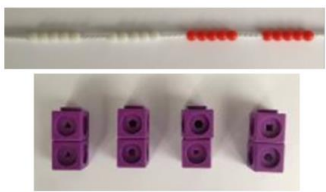


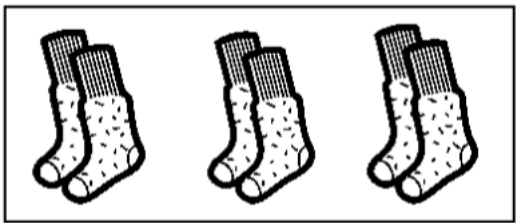
Multiplication - Reception

Objective	Concrete	Pictorial	Abstract
<p>To solve problems with doubling</p>	<p>Children use practical equipment such as numicon, multilink to double numbers.</p>  <p>Use real life situations e.g. make 3 playdough cakes now double it.</p> <p>If children are ready to they will use equal groups of objects to explore multiplication. They count up to help solve.</p>    <p>$10p + 10p + 10p + 10p + 10p = 50p$</p>	<p>Children use images such as spots on ladybirds or dominoes to explore doubling.</p>  <hr/> <p>If children are ready they could draw pictures to double numbers to 10 using frames.</p>  <p>$3 + 3 = 6$</p>	<p>Children may see doubles as addition number sentences. They may still need practical equipment or pictorial to solve.</p> <p>$1 + 1 = 2$ $2 + 2 = 4$ $3 + 3 = 6$</p>

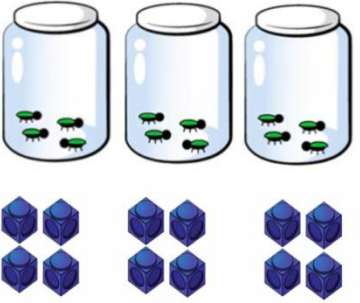
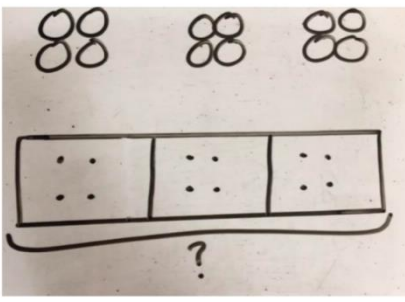
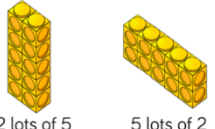
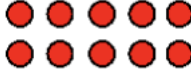
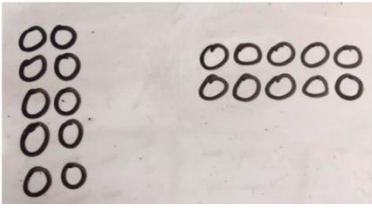


Written Calculation Policy Overview

Multiplication - Year One

Objective	Concrete	Pictorial	Abstract
To double numbers	<p>Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double numbers</p> <p>Double 4 is 8</p> 	<p>Link to multiplication</p> <p>2 lots of 4 = 8</p>
Counting in multiples of 10, 2 and 5	<p>Count the groups as children are skip counting, children may use their fingers as they are skip counting.</p>  <p>Use numicon to count lots of an amount. Use coins to count in multiples</p>  <p>$2 + 2 + 2 = 6p$</p>  <p>$5 + 5 = 10p$</p>	<p>Children draw objects groups of twos, fives and 10s. They link to repeated addition.</p>  <p>$2 + 2 + 2 = 6$</p>	<p>Children complete sequences of numbers in 2s, 5s and 10s. Including those which involve missing numbers</p> <p>2 __, 6, 8, 10, 12</p> <p>10, 20, __, 40, 50, 60</p>

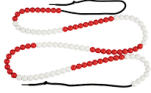

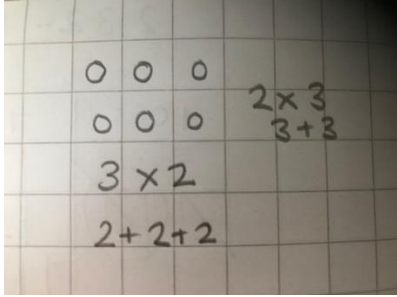
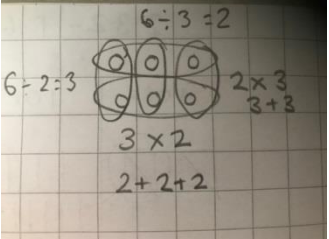
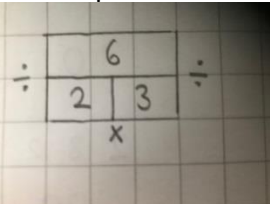


<p>To use repeated addition to multiply.</p>	<p>Repeated grouping/repeated addition 3×4 $4 + 4 + 4$ There are 3 equal groups, with 4 in each group.</p> 	<p>Children to represent the practical resources in a picture and use a bar model.</p> 	$3 \times 4 = 12$ $4 + 4 + 4 = 12$
<p>To use an array and link with repeated addition</p>	<p>Use arrays to illustrate commutativity counters and other objects can also be used. $2 \times 5 = 5 \times 2$</p>  <p>2 lots of 5 5 lots of 2</p> <p>Arrays: </p> <p>2 groups of 5 or 5 groups of 2</p>	<p>Children to represent the arrays pictorially.</p> 	<p>Children to be able to use an array to write a range of calculations e.g.</p> $10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$



Written Calculation Policy Overview

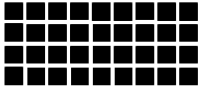
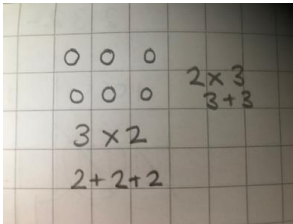
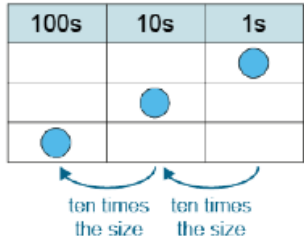
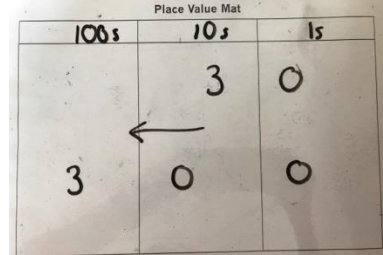
Multiplication Year 2

Objective	Concrete	Pictorial	Abstract								
<p>To count in multiples of 2, 5, 10, 3</p>	<p>Children use bead strings, number tracks, coins, counters, hands (groups of 5) Pairs of objects to count.</p> 	<p>Number lines, images of groups of objects bar models can be used to show counting.</p> <table border="1" data-bbox="913 437 1487 520"> <tr> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td colspan="4" style="text-align: center;">12</td> </tr> </table> <p>Hundred squares should also be use to spot pattern in numbers. Link counting in 2s to even numbers.</p>	3	3	3	3	12				<p>Writing sequences of numbers in 2s, 5s, 10s and 3s. Forwards and backwards with missing numbers.</p> <p>For example</p> <p>3, 6, _, 12, 15</p>
3	3	3	3								
12											
<p>To use arrays to explore commutativity</p> <p>Children should also link multiplication and division using arrays (see division)</p>	<p>Use counters, numicon, cubes to create arrays. Explore arrays in 2 different orientations to show how multiplication can be reversed.</p>  <p> $2 \times 5 = 10$ $5 \times 2 = 10$ $5 + 5 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ </p>	<p>Drawing arrays in different orientations</p> 	<p> $5 \times 2 =$ $2 + 2 + 2 + 2 = 10$ </p> <p> $2 \times 5 = 10$ $5 + 5 = 10$ </p>								
<p>To understand inverse</p>	<p>Children use arrays as above (once they have covered division)</p>	<p>Use an array to show all 4 number sentence</p> 	<p>Use the bar model to explore relationships between multiplication and division</p> 								



Written Calculation Policy Overview

Multiplication- Year Three

Objective	Concrete	Pictorial	Abstract
<p>To revise arrays from year 2.</p>	<p>Children continue to use counters to multiply single digit numbers where they do not know the times tables.</p>  <p style="text-align: right;">$9 \times 4 = 36$</p> <p style="text-align: center;">$9 \times 4 = 36$</p>	<p>As year 2. Children draw arrays in different orientations to show commutativity and also to solve single digit calculations where they do not know the times tables.</p> 	<p>$5 \times 2 =$ $2 + 2 + 2 + 2 + 2 = 10$</p> <p>$2 \times 5 = 10$ $5 + 5 = 10$</p>
<p>To multiply by 10.</p>	<p>Introduce place value counters and compare to denes before starting this activity. Explore how when we multiply by 10 the number becomes 10 times bigger and moves into the next column.</p>  <p>Children can use calculators to explore what happens when we multiply by 10. It helps to spot patterns.</p>	<p>Children use place value grids to explore what happens when we multiply single digits by 10 e.g. 8×10</p> <p>They should also explore what happens when you multiply a multiple of 10. Both digits move. (This will be essential for their understanding of multiplication method)</p> 	<p>Children apply to calculations within their times table knowledge.</p> <p>$30 \times 4 =$ $3 \times 4 = 12$ $30 \times 4 = 120$</p>



Caversham Park Primary School Calculation Policy

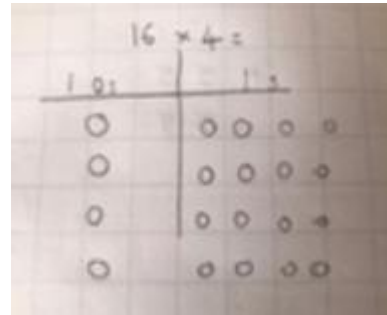
To multiply a 2 digit number by a 1 digit number

Children use the place value counters linking to their arrays to explore multiplication. Children keep the place value so we say 40 not 4 tens.



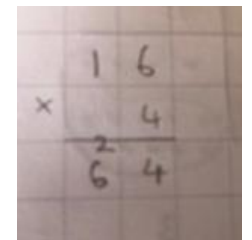
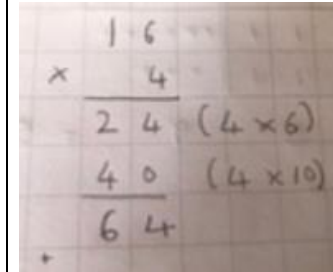
$$16 \times 4 = 40 + 24 = 64$$

There is no need to draw the lines in between rows here. Children should draw downwards in arrays. Grids could be given to children to make it easier.



$$40 + 24 = 64$$

If children are particularly able then the expanded can be condensed to the compact formal method. Please carry on the line above.

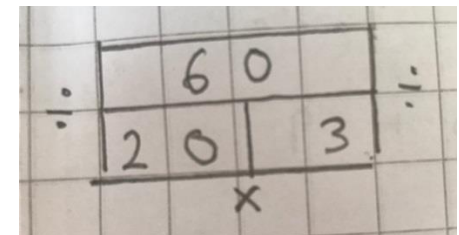


To explore inverse

Children continue to use arrays and counters to explore inverse (as year 2) for single digit numbers.

Continue to draw arrays to explore inverse for single digit numbers.

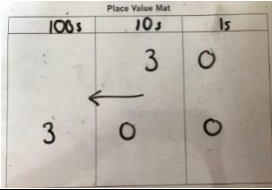

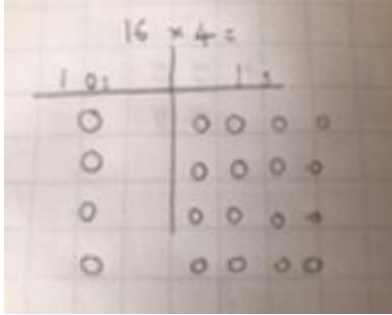
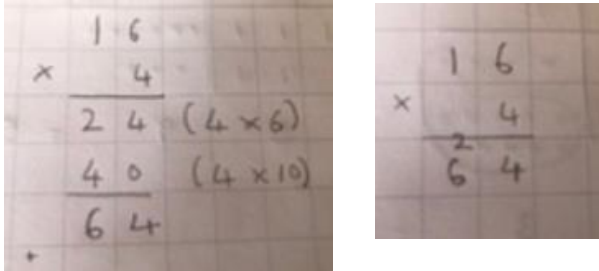
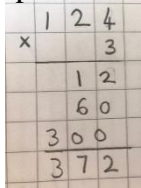
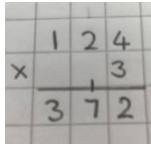
Use of bar inverse model to solve missing number problems with times tables they know and applying these to multiples of 10 (this may follow after division)





Written Calculation Policy Overview

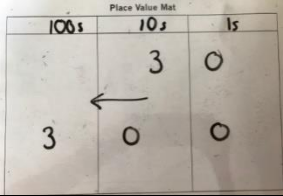
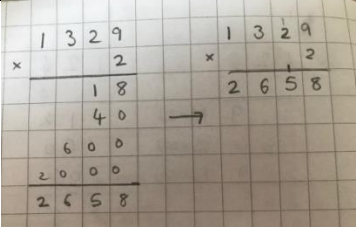
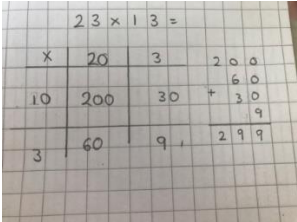
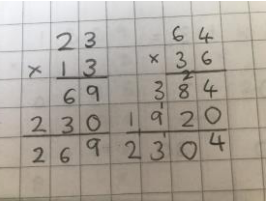
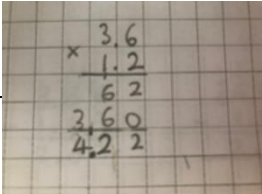
Multiplication - Year 4

Objective	Concrete	Pictorial	Abstract												
To multiply by 10 and 100	<p>$30 \times 10 = 300$</p> 	Children should draw their own place value grids.	$30 \times 10 = 300$												
To multiply a 2 digit number by a 1 digit number	<p>Children use the place value counters linking to their arrays to explore multiplication. Children keep the place value so we say 40 not 4 tens.</p>  <p>$16 \times 4 = 40 + 24 = 64$</p>	<p>There is no need to draw the lines in between rows here. Children should draw downwards in arrays. Grids could be given to children to make it easier.</p>  <p>$40 + 24 = 64$</p>	<p>If children are particularly able then the expanded can be condensed to the compact formal method. Please carry on the line above.</p> 												
To multiply a 3 digit number by a 1 digit number.	<p>As above extended to 3 digits.</p> <table border="1" data-bbox="315 1158 887 1426"> <thead> <tr> <th>100s</th> <th>10s</th> <th>1s</th> </tr> </thead> <tbody> <tr> <td>●</td> <td>● ●</td> <td>● ● ● ●</td> </tr> <tr> <td>●</td> <td>● ●</td> <td>● ● ● ●</td> </tr> <tr> <td>●</td> <td>● ●</td> <td>● ● ● ●</td> </tr> </tbody> </table> <p>$300 + 60 + 12 = 372$</p>	100s	10s	1s	●	● ●	● ● ● ●	●	● ●	● ● ● ●	●	● ●	● ● ● ●	<p>As above with 3 digits. Accompany this with the expanded method.</p> 	<p>As above with 3 digits moving to formal method.</p> 
100s	10s	1s													
●	● ●	● ● ● ●													
●	● ●	● ● ● ●													
●	● ●	● ● ● ●													



Written Calculation Policy Overview

Multiplication- Year 5 and 6

Objective	Concrete	Pictorial	Abstract
To multiply by 10, 100 and 1000 including decimals		Children should draw their own place value grids.	$30 \times 10 = 300$
To multiply a 4 digit number by a 1 digit number.	For those children who are still struggling to understand formal method. Back track to expanded or grid as necessary whilst building understanding of $\times 10$ and $\times 100$. Otherwise children should review expanded for 4 digits and then combine for formal method.		
To multiply a 2 digit number by a 2 digit number	Children return to grid method to begin to understand the process. 	Children then work to use formal method understanding that the on the second row of calculations they are multiplying by a multiple of 10 and therefore need to have a 0 in place of the units. Exchanging is done above the answer on each line. 	
To multiply a decimal by a single digit number.		To multiply a decimal by a decimal. Children use estimation to see where the decimal is placed e.g. $3 \times 1 = 3$ so the number must have 2 decimal places.	



Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first. They should know that the decimal points line up under each other.
For example:

$$4.92 \times 3$$

Children will approximate first

$$4.92 \times 3 \text{ is approximately } 5 \times 3 = 15$$

x	4	0.9	0.02	
	12	2.7	0.06	
3				12
				+ 0.7
				+ 0.06
				12.76

Conceptual variation; different ways to ask children to solve 6×23

23	23	23	23	23	23
----	----	----	----	----	----

?

Mai had to swim 23 lengths, 6 times a week.
How many lengths did she swim in one week?

With the counters, prove that $6 \times 23 = 138$

Find the product of 6 and 23

$$6 \times 23 =$$

$$\square = 6 \times 23$$

6	23
x 23	x 6
—	—

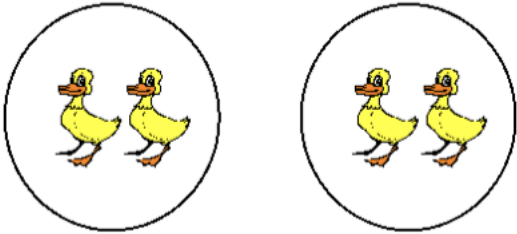
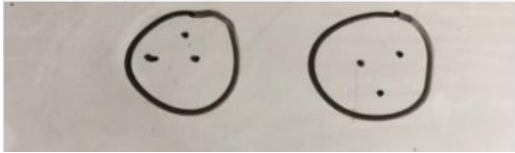

What is the calculation?
What is the product?

100s	10s	1s



Written Calculation Policy Overview

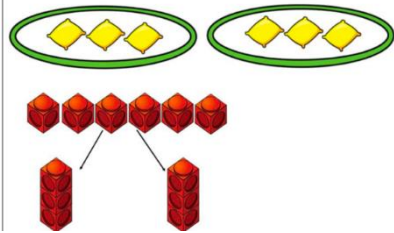
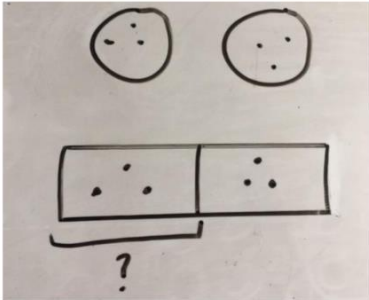

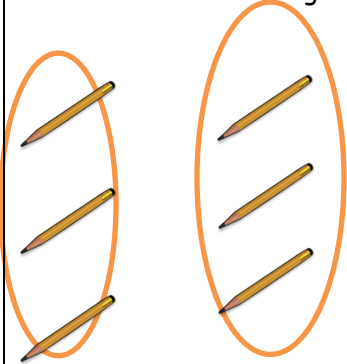
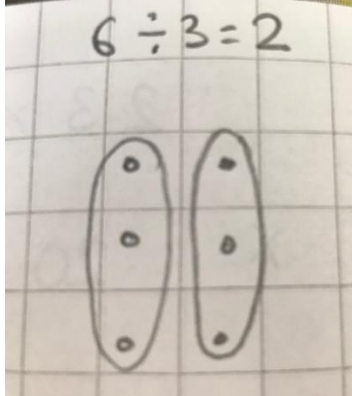
Division - Reception

Objective	Concrete	Pictorial	Abstract
<p>To solve problems with sharing and halving</p>	<p>Children will understand equal groups and share items out in play and problem solving.</p>  <p>Children investigate real life sharing through play.</p> <p>Can we share these books? Have we shared fairly? How many do you have each?</p>	<p>Children share using circles and counters or by drawing dots.</p>  <p>Children develop their understanding of halving even numbers to 10 through practical resources and images such as:</p> 	<p>This is not appropriate for Reception children</p>



Written Calculation Policy Overview

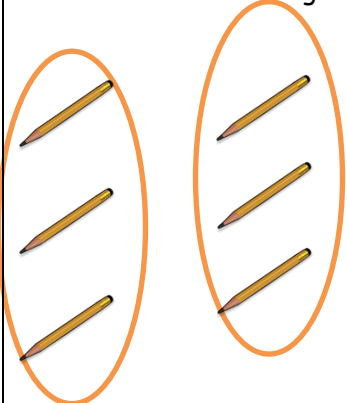
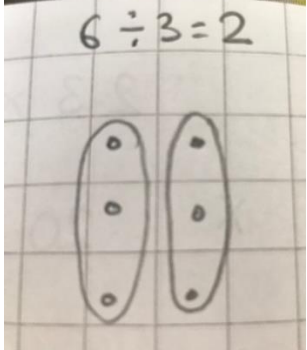
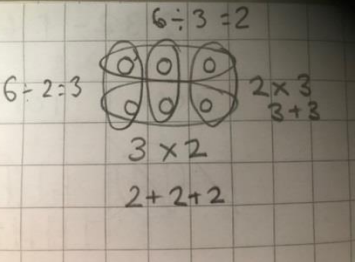
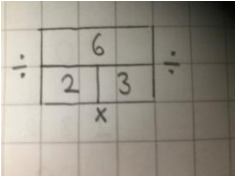

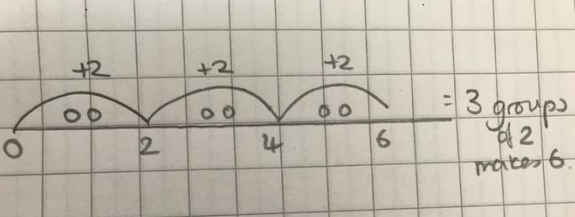
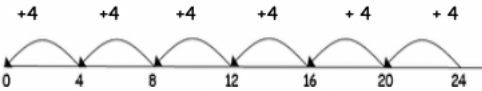
Division -Year One

Objective	Concrete	Pictorial	Abstract
<p>To share objects (link with fractions)</p> <p>This should only be taught at the beginning of the year (before term 3) and then used for finding fractions - halving etc)</p>	<p>Share objects between 2 people. How many do they have each?</p> 	<p>Represent the sharing pictorially.</p> 	
<p>To divide using grouping</p>	<p>Children divide by putting counters or objects into groups.</p> <p>$6 \div 3 =$ 6 divided into groups of</p> 	<p>Children use arrays to show division by grouping. As with multiplication they explore in different orientations.</p> 	<p>$6 \div 3 = 2$</p> <p>$6 \div 2 = 3$</p>



Written Calculation Policy Overview


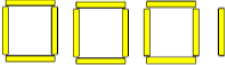
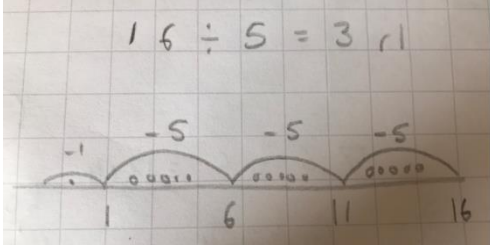
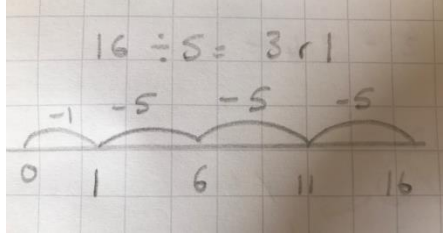
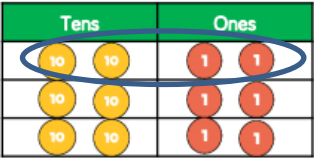
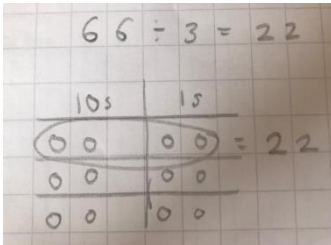
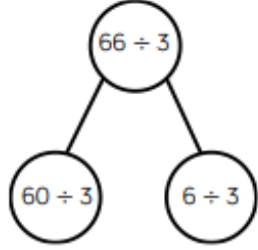
Division-Year Two

Objective	Concrete	Pictorial	Abstract
<p>To divide using grouping</p>	<p>Children divide by putting counters or objects into groups.</p> <p>$6 \div 3 =$ 6 divided into groups of</p> 	<p>Children use arrays to show division by grouping. As with multiplication they explore in different orientations.</p> 	<p>Abstract</p> <p>$6 \div 3 = 2$</p> <p>$6 \div 2 = 3$</p>
<p>To understand inverse</p>	<p>Children use arrays as above</p>	<p>Use an array to show all 4 number sentence</p> 	<p>Use the bar model to explore relationships between multiplication and division</p> 
<p>To number lines to divide into equal groups (linked only to 2, 5, 10 and 3)</p>			<p>$24 \div 4 = 6$</p> 



Written Calculation Policy Overview

Division- Year Three

Objective	Concrete	Pictorial	Abstract
<p>To divide into equal groups using concrete objects and images.</p> <p>Extend to leaving remainders.</p> <p>Either through repeated subtraction or addition if necessary</p>	<p>To continue as Year 2 with arrays to explore division and inverse</p>  <p>Use the ITP numberline to explore remainders. You could also use physical grouping of items which leave remainders.</p> <p>How many squares can you make with 13 lollipop sticks? There are ___ lollipop sticks. There are ___ groups of 4 There is ___ lollipop stick remaining. $13 \div 4 = \text{___} \text{ remainder } \text{___}$</p> 		 <p>By this point children should be beginning to be able to apply this to mental methods. Dividing numbers including remainders.</p>
<p>To divide larger numbers using multiples of 10.</p>	<p>This step is for children who have a strong sense of the above. At this stage children should have a strong grasp of timestables, multiples of 10 and remainders.</p> <p>$66 \div 3 = 22$</p>  <p>$20 + 2 = 22$</p>	<p>To do this children need to have the lines in between. This links strongly to arrays in Year 2.</p>  <p>$20 + 2 = 22$</p>	 <p>Children begin to recognise that portioning can be used to divide larger numbers.</p>

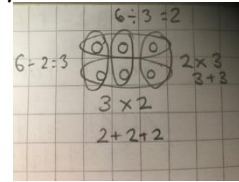


Caversham Park Primary School Calculation Policy

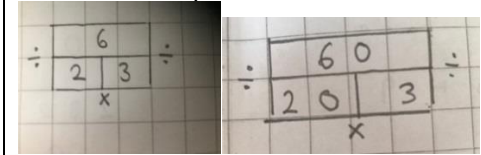
To understand inverse
Extend to multiples of 10 where possible.

Children use arrays as above

Use an array to show all 4 number sentence



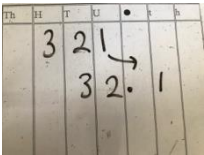

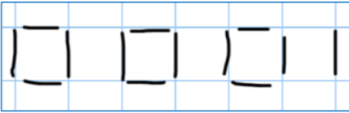
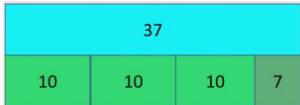
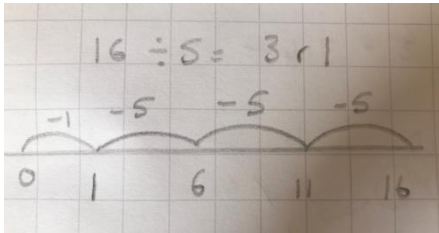
Use the bar model to explore relationships between multiplication and division





Written Calculation Policy Overview

Division - Year 4

Objective	Concrete	Pictorial	Abstract
<p>To divide by 10, 100</p>	<p>Children use place value charts to explore what happens to the placeholders when dividing by 10 and 100.</p> <p>We move the digits 1 place to the right and then use a 0 as a place holder. We are making them tens times smaller. This includes into decimals</p> 	<p>Children can draw their own place value grids to support.</p>	<p>321 ÷ 10 = 3.21</p>
<p>To divide with remainders</p> <p>(revise from Year 3 and ensure children can find remainders mentally)</p>	<p>Placing counters/objects into equal groups and seeing what is left over (remaining)</p> <hr/> <p>2d + 1d with remainders using lollipop sticks. Cuisenaire rods, above a ruler can also be used. 13 ÷ 4</p> <p>Use of lollipop sticks to form wholes- squares are made because we are dividing by 4.</p>  <p>There are 3 whole squares, with 1 left over.</p> <hr/>	<p>Children represent objects pictorially showing what is left.</p>  <p>There are 3 whole squares, with 1 left over.</p> <p>Use bar model to show remainders</p> $37 \div 10 = 3 \text{ r } 7$ 	<p>Use ITP grouping to show remainders on a number line. Children draw numberlines for remainders.</p> 



Caversham Park Primary School Calculation Policy

Encourage mental division of larger numbers through partitioning.

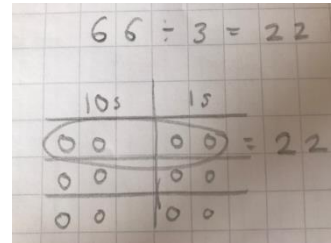
This step is for children who have a strong sense of the above. At this stage children should have a strong grasp of timestables, multiples of 10 and remainders.

$$66 \div 3 = 22$$

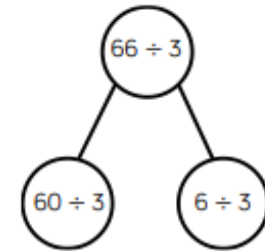
Tens		Ones	
10	10	1	1
10	10	1	1
10	10	1	1

$$20 + 2 = 22$$

To do this children need to have the lines in between. This links strongly to arrays in Year 2.



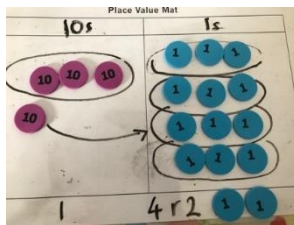
$$20 + 2 = 22$$



Children begin to recognise that portioning can be used to divide larger numbers.

To use short division to divide TU by U

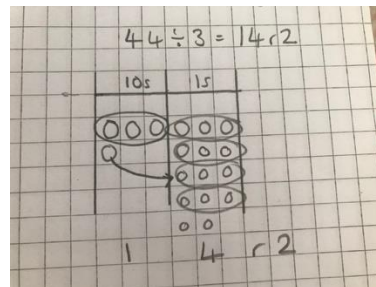
$44 \div 3 =$
Lay out 4 tens in rows of 3. (always rows of the number you are dividing by)
Lay out 4 units in rows of 3. (always rows of the number you are dividing by)



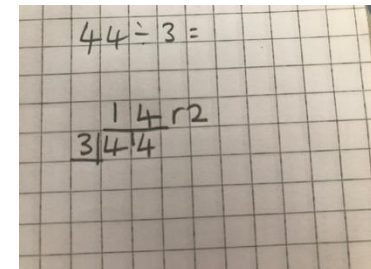
How many groups of 3 tens can I get into 40?
Exchange the remaining ten for 10 1s and put in rows of 3.

How many group of 3 ones can I get? What is left?

Represent in books. Make sure that the children make the grid the same squares wide or wider than the divisor (number you are dividing by-laying out in rows is easier)

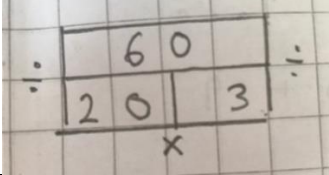


Move onto short division using the same language. How many groups of 3 can I get into 4 tens? Etc.






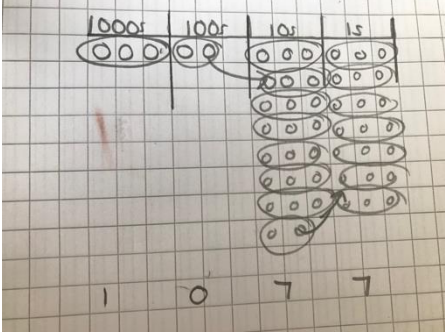
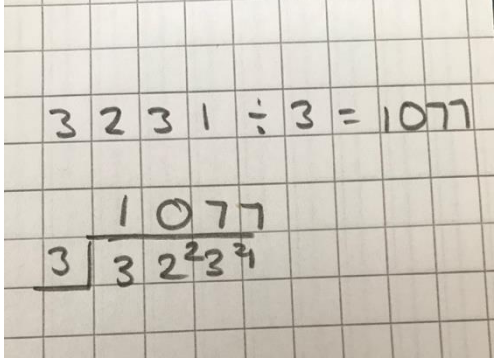
Caversham Park Primary School Calculation Policy

<p>Children continue to use arrays and counters to explore inverse</p>		<p>Use of bar inverse model to solve missing number problems with times tables they know and applying these to multiples of 10 and 100 (this may follow after division)</p>  <p>The image shows a handwritten bar inverse model on grid paper. It consists of a large rectangle divided into two parts by a vertical bar. The top part contains the number '60' and the bottom part contains '20'. To the left of the bar is a division symbol '÷', and to the right is another '÷'. Below the bar, centered under the '20', is a multiplication sign 'x' and the number '3'. This represents the equation 60 ÷ 20 = 3.</p>	
--	--	--	--



Written Calculation Policy Overview

Division- Year 5 and 6

Objective	Concrete	Pictorial	Abstract
<p>To divide by 10, 100 and 1000</p> <p>(Year 6)</p> <p>multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places</p>	<p>Children use place value charts to explore what happens to the placeholders when dividing by 10 and 100.</p> <p>We move the digits 1 place to the right and then use a 0 as a place holder. We are making them tens times smaller. This includes into decimals.</p> 	<p>Children can draw their own place value grids to support.</p>	<p>321 ÷ 10 = 3.21</p>
<p>To divide numbers up to 4 digits by a single digit.</p>	<p>As Year 4 extending to 3 and 4 digits.</p> <p>By the time children reach 4 digits their understanding should be secure enough not to need concrete practice.</p>		



<p>To begin to show remainders as fractions or decimals</p> <p>(Year 6)</p> <p>use written division methods in cases where the answer has up to two decimal places</p>																																			
<p>Children continue to use arrays and counters to explore inverse</p>		<p>Use of bar inverse model to solve missing number problems with times tables they know and applying these to multiples of 10 and 100 (this may follow after division)</p>																																	
<p>(Year 6 only)</p> <p>To use long division to divide larger numbers</p> <p>(including remainders)</p>	<p>Long division using place value counters</p> <p>2544 ÷ 12</p> <table border="1" data-bbox="318 1129 526 1193"> <tr> <th>1000s</th> <th>100s</th> <th>10s</th> <th>1s</th> </tr> <tr> <td>2</td> <td>5</td> <td>4</td> <td>4</td> </tr> </table> <p>We can't group 2 thousands into groups of 12 so will exchange them.</p> <table border="1" data-bbox="318 1200 526 1289"> <tr> <th>1000s</th> <th>100s</th> <th>10s</th> <th>1s</th> </tr> <tr> <td>1</td> <td>15</td> <td>4</td> <td>4</td> </tr> </table> <p>We can group 24 hundreds into groups of 12 which leaves with 1 hundred.</p> $\begin{array}{r} 0.2 \\ 12 \overline{) 2544} \\ \underline{24} \\ 1 \end{array}$	1000s	100s	10s	1s	2	5	4	4	1000s	100s	10s	1s	1	15	4	4	<table border="1" data-bbox="952 1098 1176 1193"> <tr> <th>1000s</th> <th>100s</th> <th>10s</th> <th>1s</th> </tr> <tr> <td></td> <td>2</td> <td>0</td> <td>3</td> </tr> </table> <p>After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens.</p> $\begin{array}{r} 0.21 \\ 12 \overline{) 2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 2 \end{array}$ <table border="1" data-bbox="952 1209 1176 1305"> <tr> <th>1000s</th> <th>100s</th> <th>10s</th> <th>1s</th> </tr> <tr> <td></td> <td>2</td> <td>4</td> <td>4</td> </tr> </table> <p>After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder.</p> $\begin{array}{r} 0.212 \\ 12 \overline{) 2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$	1000s	100s	10s	1s		2	0	3	1000s	100s	10s	1s		2	4	4	$\begin{array}{r} 0.212 \\ 12 \overline{) 2544} \\ \underline{24} \\ 14 \\ \underline{12} \\ 24 \\ \underline{24} \\ 0 \end{array}$
1000s	100s	10s	1s																																
2	5	4	4																																
1000s	100s	10s	1s																																
1	15	4	4																																
1000s	100s	10s	1s																																
	2	0	3																																
1000s	100s	10s	1s																																
	2	4	4																																



Conceptual variation; different ways to ask children to solve $615 \div 5$

Using the part whole model below, how can you divide 615 by 5 without using short division?



I have £615 and share it equally between 5 bank accounts. How much will be in each account?


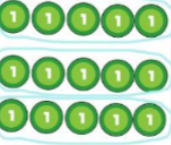
615 pupils need to be put into 5 groups. How many will be in each group?

$$5 \overline{)615}$$

$$615 \div 5 =$$

$$\square = 615 \div 5$$


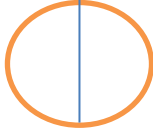
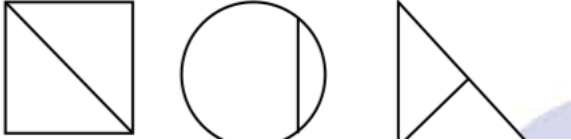
What is the calculation?
What is the answer?

100s	10s	1s
		



Written Calculation Policy Overview


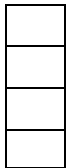


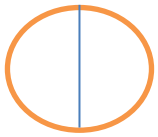

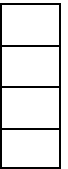
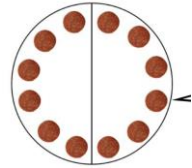
Fractions- Reception

Objective	Concrete	Pictorial	Abstract
<p>To find half of objects.</p> <p>(also finding halves of numbers through sharing see division)</p>	<ul style="list-style-type: none">• Talk about two halves• Show and talk about halves and of objects using equal sharing such as Sandwiches, apples, grapes and shapes 	<p>Draw halves and quarters of shapes</p>  <ul style="list-style-type: none">• Which of these shapes is split into halves? 	<p>Not applicable</p>



Written Calculation Policy Overview

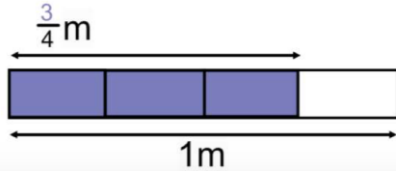
Fractions – Year One

Objective	Concrete	Pictorial	Abstract
<p>recognise, find and name a half and a quarter of a shape</p>	<ul style="list-style-type: none"> • Talk about two halves = 1, four quarters = one. • Show and talk about halves and quarters of objects using equal sharing and grouping such as: • Sandwiches, apples, grapes and shapes  • Fold strips of paper into halves, quarters • Cut pieces of ribbon, string into halves and quarters. <p>Use multi link. Make a tower half/quarter as tall as this tower: </p> <p>Use Numicon/Cuisenaire rods. Can you find a rod half the size of this one? </p> 	<p>Draw halves and quarters of shapes</p>  <ul style="list-style-type: none"> • Which of these shapes is split into halves?  <ul style="list-style-type: none"> • On a clock face, show half-past 7. • Half, quarter and three-quarter turn when telling the time. <p>Draw a tower half as tall as this one: </p>	<p>Solve problems when telling the time:</p> <p><i>o "Sue got on a bus at 9o'clock. The journey took half an hour. What time did she get off the bus?"</i></p> <p><i>"Mary went in to a shop at half past 10 and came out at 11 o'clock. How long was she in the shop for?"</i></p> <p>Identify on a number line halves and quarters</p> <p>Find $\frac{1}{2}$ of 10 or $\frac{1}{4}$ of 8</p>
<p>recognise, find and name a half and a quarter of objects</p> <p>recognise, find and name a half</p>	<ul style="list-style-type: none"> • Solve problems involving halves and quarters, e.g. planning a picnic for 2 or 4 people. • Solve problems by sharing one thing between two people, and four people: Bars of chocolate, Jar of sweets 	<p>Half of 12 = 6 $\frac{1}{2}$ of 12 = 6</p>  <p>Use shape to link with amounts</p>	<ul style="list-style-type: none"> • Solve problems such as: Tom is half as old as Roy. How old could Tom and Roy be? • Jill and Bob collect coins. Jill collects 1p coins and Bob collects 5p coins. If they both had 4 coins, how much would



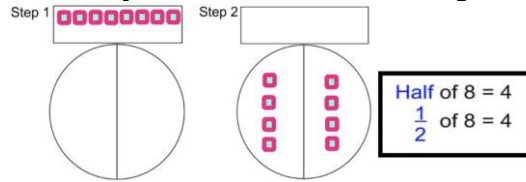
and a quarter of quantities

- Solve problems such as: o Find $\frac{1}{4}$ of 12 biscuits ... 8 pencils ...
- Find $\frac{1}{2}$ of these 14 pennies ... 9 biscuits ... 30 children in the class.
- Fill the jar half/quarter full

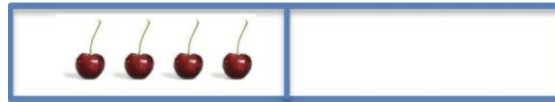


- Empty $\frac{1}{4}$ of this jug out.

Share objects into circles or rectangles



Use paper strips with objects on to halve and quarter.



Ring half the set of buttons:

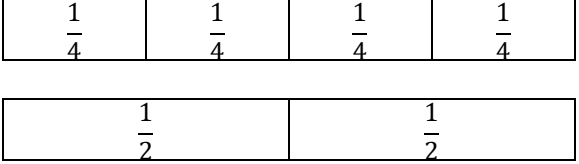





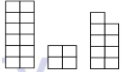
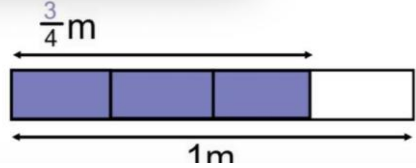
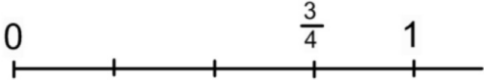


each have? (How much would they have altogether?)



Written Calculation Policy Overview

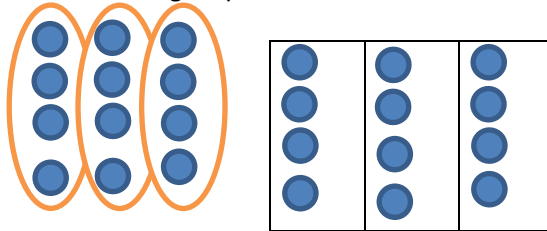
Fractions- Year Two

Objective	Concrete	Pictorial	More ideas
<p>Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a shape.</p>	<p>Find fractions of shapes through paper folding. (use the same size strips) You could use strips or circles, squares etc. Children write fractions on. Lay out to compare sizes.</p>  <p>Make and talk about patterns for example with beads or multilink such as: Using 20 cubes make a shape that is $\frac{1}{2}$ red and $\frac{1}{4}$ blue. What fraction is left?</p> <p>Use fractions walls, fraction action or fraction circles to explore fractions of number.</p>	<p>Children are given outlines of shapes which they mark on halves, quarters and thirds. Make sure they mark accurately ensuring the concept of equal parts.</p> <p>Show unequal parts- are these correct?</p>  <p>Draw rectangles using the squares in books. Which numbers can we find half off? What happens if we halve an odd number of squares?</p> <ul style="list-style-type: none"> Count in halves up to 10, showing this on a number line and visually, e.g. as halves of a rectangular model. 	<ul style="list-style-type: none"> On a clock face, show $\frac{1}{4}$ to/past the hour. How far round the clock face is $\frac{3}{4}$ of the hour? Use time and a clock face to support understanding of $\frac{1}{2}$ and $\frac{1}{4}$ by solving problems such as: "Mary went into a shop at 10:30 and came out at 10:45. What fraction of the hour was she in the shop?" PE lesson: turn $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$ turns clockwise and anti-clockwise. Program robots to travel around a maze. <p>Complete the shading on this diagram so that one half is shaded:</p>  <p>If I can see $\frac{1}{4}$ how many quarters can you see?</p>  <p>If I can see $\frac{2}{3}$ how many thirds can you see?</p> 
<p>Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length.</p>	<p><u>Lengths</u></p> <p>Children find $\frac{3}{4}$ of the lengths of a piece of string, a strip of paper, ribbon, shoelace by folding. Children should be taught to find $\frac{1}{4}$ by halving and halving again.</p> <p>Make a tower $\frac{1}{3}$ or $\frac{3}{4}$ of the size of this one.</p> 	<p>Find halfway marks on drawings of ribbons, towers. This could also be linked to measurement in cm.</p> <p>Draw a line 10cm long. Measure and mark halfway. Measure and mark $\frac{1}{4}$. I have a tower of 12 bricks. $\frac{1}{4}$ are red. $\frac{1}{2}$ are blue. The rest are green. Colour how many are green.</p>	 



Recognise, find, name and write fractions $1/3$, $1/4$, $2/4$ and $3/4$ of a set of objects or quantity.

Using counters or objects share the counters using the denominator. Use circles or frames. E.g. $1/3$ of 12 = 12 shared into 3 groups = 4

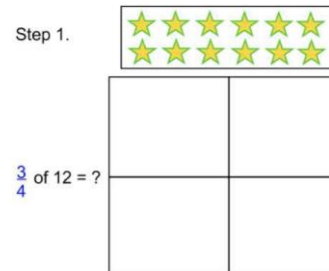


Share 1, 2, 3 or 4 things such as pizzas, and chocolate bars between 3 and then 4 people to solve problems.

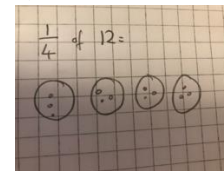
Use equal grouping and sharing to find unit fractions.

Plan a picnic and explore dividing different sorts of food and drinks between people using equal sharing and grouping.

Using squares, rectangles, draw shapes in sharing. Link to shape.



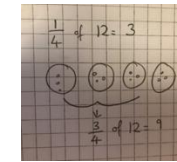
Draw circles and share dots or images of objects to find fractions:



Recognise that $3/4$ is how many are in 3 out of 4 groups.

Children can be supported with pictorial throughout.

$1/2$ of 8 = 4
 $3/4$ of 12 = 9



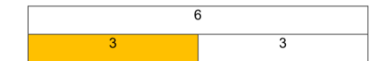
Children should related $1/2$ to finding half of a number and 2x table (division facts)

Test statements to confirm whether they are always, sometimes, never true: "There are 4 numbers less than 10 that divide exactly in half to give a whole number."

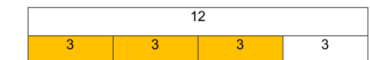
Word problems: "Think of a number and then halve it. The answer is 9. What could the number be?"

Bar model

$1/2$ of 6 = 3

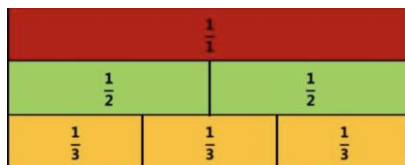


$3/4$ of 12 = 9



recognise the equivalence of $2/4$ and $1/2$

Use Cuisenaire rods, fraction walls and fraction circles to explore equivalence



Fold strips of paper and paper shapes in halves and quarters to recognise equivalence

Draw their own fraction walls to compare sizes of fractions.

Draw shapes - colour $1/2$ red $1/4$ green $1/4$ blue. Draw a strip and shade $1/3$ green, $1/3$ yellow etc.



Which two fractions are the same size?

$1/2$ $1/3$

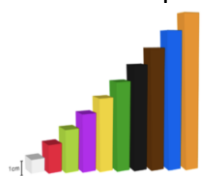

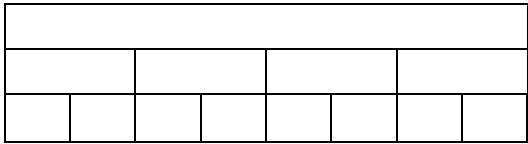
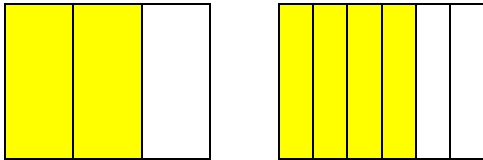
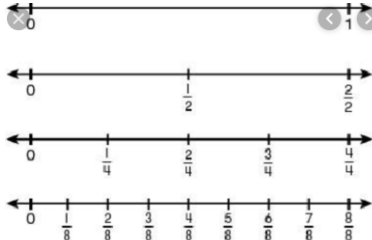
$1/4$ $3/4$

$2/4$



Written Calculation Policy Overview

Fractions- Year Three

Objective	Concrete	Pictorial	Abstract
<p>recognise and show, using diagrams, equivalent fractions with small denominators</p>	<p>Use Cuisenaire rods, fraction walls and fraction circles to explore equivalence</p>   <p>Fold strips of paper and paper shapes in halves and quarters to recognise equivalence Make connections between numerator and denominator $4/8 = 1/2$ because 4 is half of 8.</p> <p>Stack fraction circles to see which fractions are equivalent particularly to 1 whole.</p> <p>Understand quarter turns in PE when turning clockwise and anti-clockwise. Link quarter turns to a quarter of a circle. The same could be done with compass points in Geography.</p> <p>Link quarters to work on time.</p>	<p>Build their own fraction strips to compare sizes of fractions (This can be done with giving strips the same size and folding) Link to fraction wall</p>  <p>Recognise that $1/8$ is half of $1/4$. The smaller the denominator the bigger the piece!</p> <p>Match fractions of the same size shape to see visually that $2/3 = 4/6$. e.g</p> 	<p>Count in fractions visually on number lines.</p>  <p>Complete number lines with fractions and compare sizes.</p>



Caversham Park Primary School Calculation Policy

Compare and order unit fractions or those with the same denominator

Use a fraction wall to support ordering fractions on a number line.



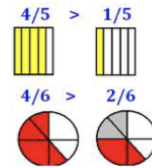
Recognise and use fractions as numbers.

You can also use Cuisenaire rods for this.

Use pieces of string to compare and order fractions of length.

Use fraction circles/fraction action to compare size of fractions.

Use shapes such as a rectangular model to order unit fractions and non-unit fractions with the same denominator.



Use fraction strips as above to compare and order fractions.

Use number lines to compare and order fractions.

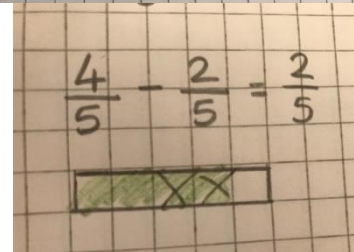
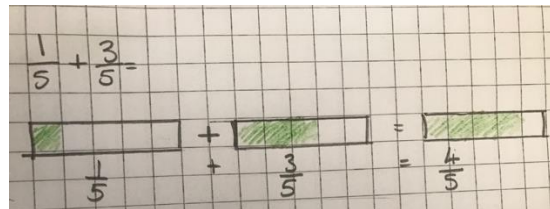
Choose a number on a number line. Where would $1/5$ be? $1/10$? $1/2$?

add and subtract fractions with the same denominator within one whole (e.g. $5/7 + 1/7 = 6/7$)

Use fraction walls, Cuisenaire rods and fraction circles to practically add fractions.



Show fractions on a rectangular model and draw in books.



$$1/5 + 3/5 = 4/5$$

Solve missing fraction problems which work on making pairs to a whole.

$$2/8 + \square = 8/8$$

If I have a pizza and I eat $2/5$. My friend eats the rest. What fraction does he eat?



To recognise the importance of a whole in relation to fractions.

Using fraction walls/ Cuisenaire rods, fraction circles. I have $\frac{1}{2}$. What else do I need to make a whole?

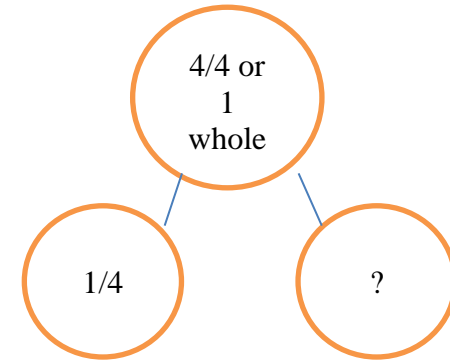


$\frac{2}{5}$ is shaded. What fraction is not shaded?



Children draw pictures to answer questions such as

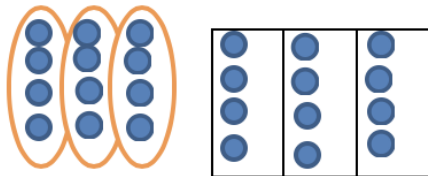
$$\frac{2}{6} + \square = \text{a whole}$$



Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.

As Year 2 use counters to find unit fractions of numbers and then explore non-unit. e.g. use circles or shapes to share. Ensure children understand that the denominator is the number of groups you are sharing into.

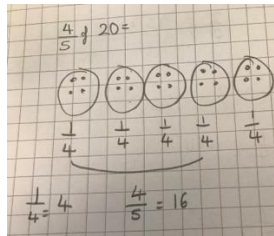
When exploring non unit fractions demonstrate $\frac{1}{3}$, $\frac{2}{3}$ and $\frac{3}{3}$ so children begin to understand 1 out of 3 groups 2 out of 3 groups 3 out of 3 groups.



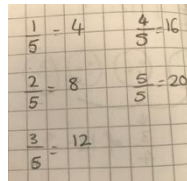
$$\begin{aligned} \frac{1}{3} \text{ of } 12 &= 4 \\ \frac{2}{3} \text{ of } 12 &= 8 \\ \frac{3}{3} \text{ of } 12 &= 12 \end{aligned}$$

Children draw circles or rectangles and squares to find fractions of numbers.

Always encourage to find the unit fraction first,



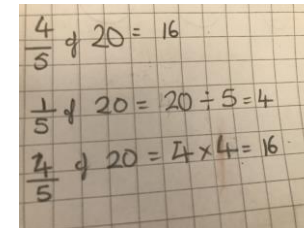
Also explore using fraction chains.



Use bar model to support finding fractions of number. Link to division and times tables

Only move to complete abstract if they understand. DO NOT teach to divide by bottom and times by top in Year 3 as it means nothing to them!

Instead say. First we have to find $\frac{1}{5}$...



Solve problems finding unit and non-unit fractions of measures.

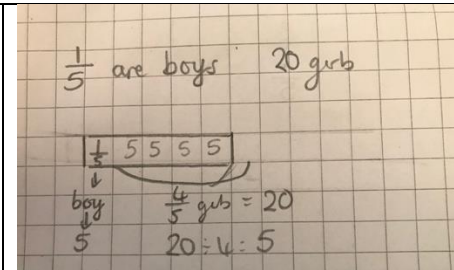
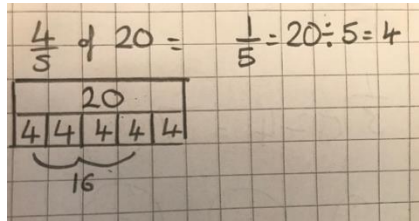
12 sweets are shared equally between 4 children; how much each?

Use bar model to solve problems:

In Year 3 $\frac{1}{5}$ of the children are boys. There are 20 girls. How many boys are there?



they know. Always find the unit fraction first.



Including those which involve ratio.

William has made a pattern using 12 tiles. One tile in every four is red. How many tiles are

- A pink roll of tape is 50cm long. A yellow one is $\frac{1}{2}$ as long. How long are they altogether?

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.

Use bead strings to count in tenths. Count in tenths using merged hundred square.

Explore that when you split a chocolate into 10 parts and take, you no longer have a whole bar so $2/10 = 0$ wholes and 2 bits so 0.2

Count in tenths on number lines divided into ten equal pieces.

Use place value grids to explore what happens when dividing a single digit number by 10 to show decimal. Digits move to the right

10s	1s	Tenths
	8	
	0	8

Children order, compare, add and subtract tenths as with other fractions.

Link to dividing by 10 with numbers

$$6 \div 10 = 0.6$$

Explore chains

$$1 \div 10 = 0.1$$

$$2 \div 10 = 0.2$$

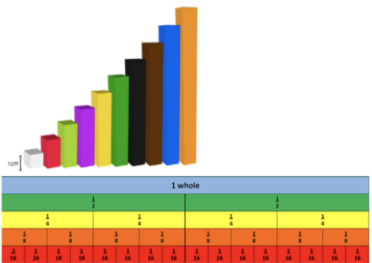

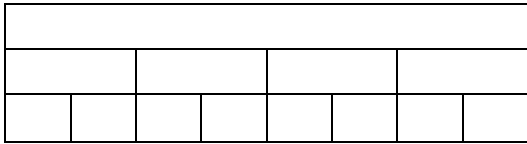
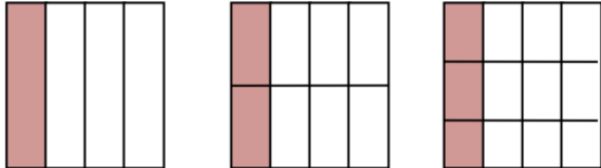

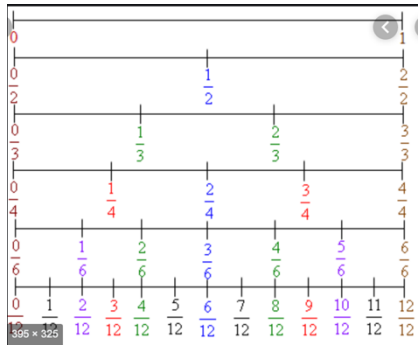
$$3 \div 10 = 0.3$$

$$4 \div 10 = 0.4$$



Written Calculation Policy Overview

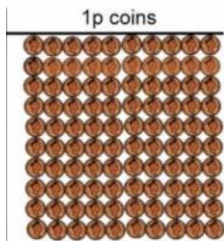
Fractions- Year Four

Objective	Concrete	Pictorial	Abstract
<p>recognise and show, using diagrams, families of common equivalent fractions with denominators which are multiples of the same number.</p>	<p>Use of fraction walls, Cuisenaire rods to compare fractions with denominators which are multiples of the same number e.g. halves, quarters and eighths/ thirds, sixths and twelfths/ fifths and tenths</p>  <p>Fraction circles/fraction action can also be used.</p> <p>Use ITP fraction wall to begin to explain the abstract method of finding equivalence.</p> <p>Compare any two Cuisenaire rods and say what fraction one rod is of the other another. (E.g. 4/6 of the total is yellow, 2/6 of the total is red.)</p> 	<p>As Year 3</p> <p>Build their own fraction strips to compare sizes of fractions (This can be done with giving strips the same size and folding) Link to fraction wall</p>  <p>Recognise that $\frac{1}{8}$ is half of $\frac{1}{4}$. The smaller the denominator the bigger the piece!</p> <p>Use a rectangular model marking it with horizontal lines to show a fraction and show equivalent fractions by splitting the rectangle up into smaller fractions with horizontal lines.</p>  <p>$\frac{1}{4} = \frac{2}{8} = \frac{3}{12}$</p>	<p>Link pictorial and concrete to begin to see link with fractions.</p>  <p>Using the diagram, complete the equivalent fractions.</p> $\frac{1}{3} = \frac{\square}{6} = \frac{\square}{12} = \frac{\square}{24}$ <p>Use number lines to explore equivalence.</p> 

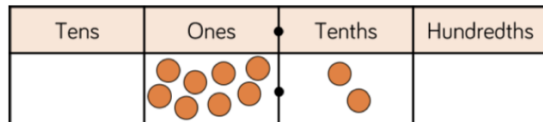
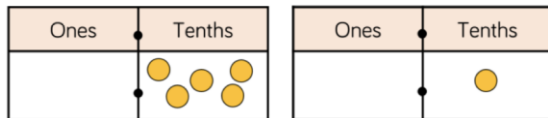


Recognise and write decimal equivalents of any number of tenths or hundredths

Use a hundred square with decimals written in 0.01, 0.02 etc to count and build understanding. Link this to money. You could show a hundred square with 1p coins in to start with. Count in pennies. How would we write 3p? 10p as a decimal? Then remove coins and place in decimal notation.



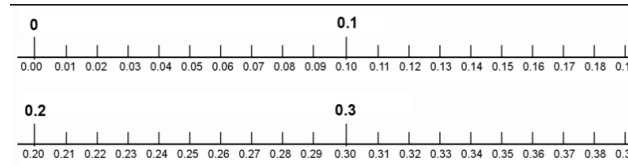
Explore place value using place value grids, arrow cards, place value counters and tens frames. Use counters and tens frames before dealing with abstract.



Record as a decimal and as a fraction e.g.
 $0.34 = \frac{3}{10}$ and $\frac{4}{100}$
 $3 \times 10p$ and $4 \times 100p$

Count in hundredths and tenths using bead strings. Record the number you stop on as a decimal and fraction.

Explore number lines with decimal equivalents of tenths and hundredths. Ensure children understand number boundaries.



Draw amounts in coins £1s 10ps and 1ps and show decimal notation.

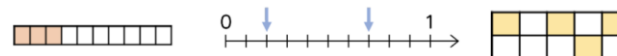
Complete hundred squares with missing boxes

Create tables linking pictorial to abstract

Complete the table.

Image	Words	Fraction	Decimal
	five tenths		
			0.9

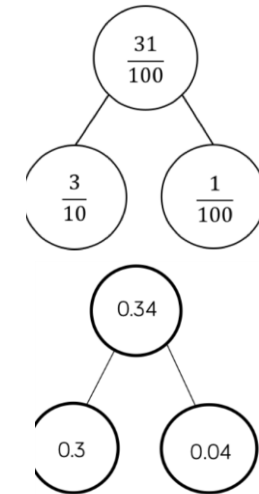
What fractions and decimals are represented in these diagrams?



Use Gattengo chart to explore patterns of number

101	201	301	401	501	601	701	801	901
11	21	31	41	51	61	71	81	91
1	2	3	4	5	6	7	8	9
0.01	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09

Understand fractional representation of tenths and hundredths.



Link to decimal notation.

Image	Words	Fraction	Decimals
	56 hundredths		
		$\frac{17}{100}$	
			0.2

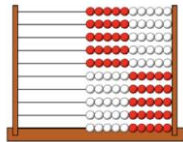


recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$

Encourage through using the decimal hundred square. When counting and landing on 0.50 - we are half way down the grid so 0.50 is 50/100 $\frac{1}{2}$. $0.25 = 25/100 = \frac{1}{4}$ of the way etc.

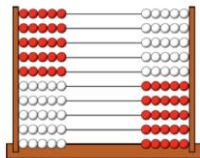
How many beads are red?
What fraction is this?

$$\frac{1}{2} = 50/100 = 5/10 \text{ so } \frac{1}{2} = 0.50$$



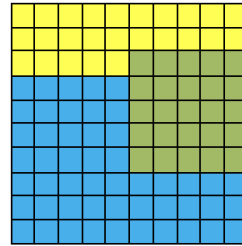
There are 4 groups of beads. 1 out of the 4 groups is 25 beads

$$\begin{aligned} \frac{1}{4} &= 25/100 = 0.25 \\ \frac{2}{4} &= 50/100 = 0.50 \\ \frac{3}{4} &= 75/100 = 0.75 \\ \frac{4}{4} &= 100/100 = 1.0 \end{aligned}$$



Use money- $\frac{1}{2}$ of £1.00 = 50p or 0.50

Using blank hundred squares. 0.25 of my square is yellow.. $\frac{1}{4}$ is green. 0.50 is blue



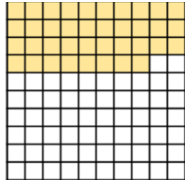
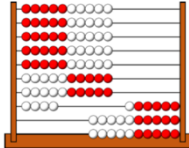
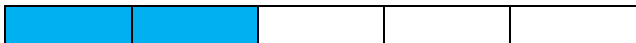
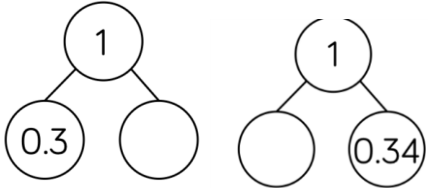
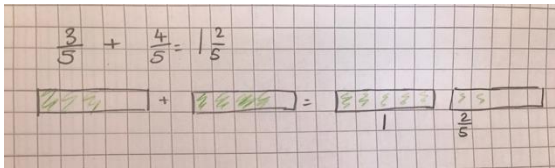
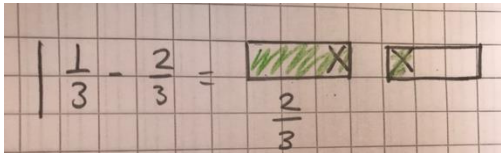
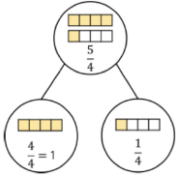
Colour different combinations practicing the relationships between the different fractions and decimals, Create patterns- garden designs using symbols.

Use number lines to find halves, quarters and record as decimals or fractions.

Practice writing halves, quarters in different ways (tables as above)

Image	Words	Fraction	Decimals
	56 hundredths		
		$\frac{17}{100}$	
			0.2



<p>To understand the relationship between fractions and the whole and decimals and the whole.</p>	<p>Working with hundred squares with coins. Show some missing. How many more would I need to make a whole pound?</p> <p>$£0.30 + £0.70$ makes $£1.00$ $30/100 + 70/100 = 100/100$ $0.30 + 0.70 = 1.00$ $3/10 + 7/10 = 10/10$</p> <p>Give children $£1.00$ in 10ps. Make combinations and link to tenths.</p> <p>Children then experiment with their own hundred squares and coins or counters to make different combinations of a whole.</p> <p>Repeat with $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{3}{4}$ as well.</p> <p>For other fractions use fraction walls and fraction circles to explore a whole (as Year 3)</p>	<p>Use previous models to focus on a whole.</p> <p>Here is a hundred square. How many hundredths are shaded? How many more hundredths do you need to shade so the whole hundred square is shaded? ___ hundredths + ___ hundredths = 1 whole</p>  <p>Here is a rekenrek with 100 beads. Each bead is one hundredth of the whole.</p>  <p>___ hundredths are on the left. ___ hundredths are on the right. $0.__ + 0.__ = 1$</p> <p>Children draw rectangular models to solve missing problems with the whole</p> <p>$2/5$ is shaded. What fraction is not shaded?</p> 	<p>Explore part whole models with decimals And also fractions</p>  <p>Revise adding and subtracting fractions to whole from year 3 with the same denominator.</p>
<p>add and subtract fractions with the same denominator (including beyond a whole)</p>	<p>Revise adding and subtracting fractions within a whole as in Year 3.</p> <p>Explore what happens when you go over 1 whole. Use real life context. I am planning a birthday and I have 15 children including myself. My cake is split into 8 pieces. Will this be enough? Explore using fraction circles.</p>	<p>Use rectangular models to explore adding and subtracting fractions over 1 whole</p>  	<p>Use part whole models to explore</p>  <p>Complete. You may use part-whole models to help you.</p> $\frac{10}{3} = \frac{9}{3} + \frac{\square}{3} = 3\frac{\square}{3}$ <p>All of these models can then be used to add or subtract more than 1 fraction.</p>



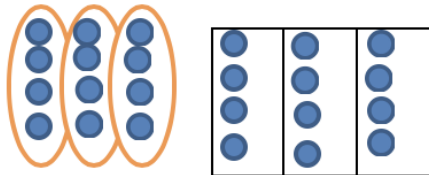
Caversham Park Primary School Calculation Policy

Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.

To solve problems with finding fractions of money and measure

As in Year 3 children should be encouraged to use counters to share into groups to understand how to find fractions of number.

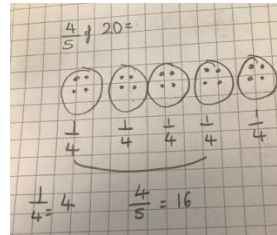
When exploring non unit fractions demonstrate $\frac{1}{3}$, $\frac{2}{3}$ and $\frac{3}{3}$ so children begin to understand 1 out 3 groups 2 out 3 groups 3 out of 3 groups.



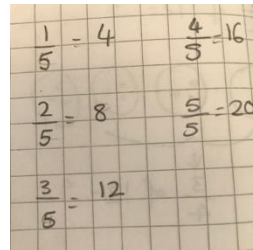
- $\frac{1}{3}$ of 12 = 4
- $\frac{2}{3}$ of 12 = 8
- $\frac{3}{3}$ of 12 = 12

Children draw circles or rectangles and squares to find fractions of numbers.

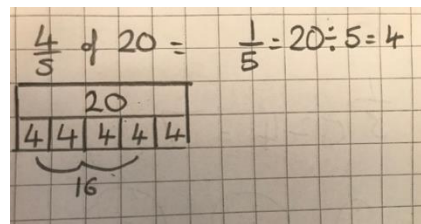
Always encourage to find the unit fraction first,



Also explore using fraction chains.

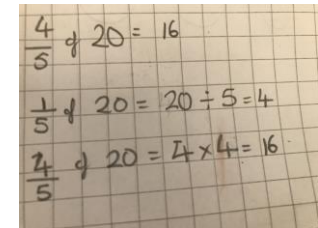


Use bar model to support finding fractions of number. Link to division and times tables they know. Always find the unit fraction first.



Only move to complete abstract if they understand. Children may begin to use term such as divide by the bottom and times by the top but only alongside the jottings they make. These jottings must show the understanding of finding the unit fraction first and then the non unit.

First we have to find $\frac{1}{5}$...



Solve problems finding unit and non-unit fractions of measures and money.

A bottle of lemonade holds approximately $\frac{1}{4}$ 4l or $\frac{1}{1}$ 4l?

o There are 36 children in a class. Half of them have flavoured crisps. One third of them have plain crisps. How many children have crisps?

O Gran gave me £8 of my £10 birthday money. What fraction of my birthday money did Gran give me?

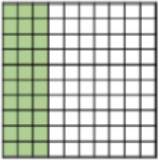
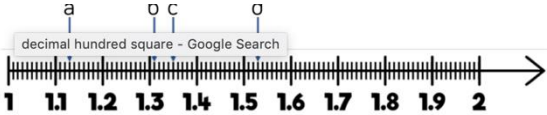



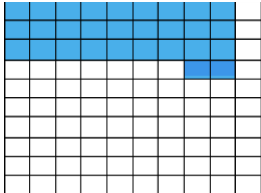
Use bar model when solving more complex problems.

Solve problems with simple ratio *To cook rice you need 5 cups of water for every cup of rice. In the saucepan, you put in 3 cups of rice. How much water needs to go in the mix?*



Written Calculation Policy Overview

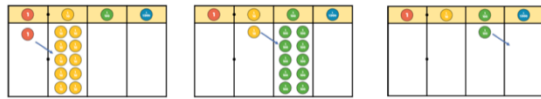
Fractions- Year 5 and 6

Objective	Concrete	Pictorial	Abstract																																																																																																																												
<p>Count up and down in tenths hundredths read and write decimal numbers as fractions (e.g. $0.71 = \frac{71}{100}$)</p>	<p>Using bead strings and hundred squares review counting up in tenths and hundredths. As in Year 4 pause during counting and ask children to show 0.23 in different ways.</p> <table border="1" data-bbox="651 598 857 794"> <tr><td>0.01</td><td>0.02</td><td>0.03</td><td>0.04</td><td>0.05</td><td>0.06</td><td>0.07</td><td>0.08</td><td>0.09</td><td>0.10</td></tr> <tr><td>0.11</td><td>0.12</td><td>0.13</td><td>0.14</td><td>0.15</td><td>0.16</td><td>0.17</td><td>0.18</td><td>0.19</td><td>0.20</td></tr> <tr><td>0.21</td><td>0.22</td><td>0.23</td><td>0.24</td><td>0.25</td><td>0.26</td><td>0.27</td><td>0.28</td><td>0.29</td><td>0.30</td></tr> <tr><td>0.31</td><td>0.32</td><td>0.33</td><td>0.34</td><td>0.35</td><td>0.36</td><td>0.37</td><td>0.38</td><td>0.39</td><td>0.40</td></tr> <tr><td>0.41</td><td>0.42</td><td>0.43</td><td>0.44</td><td>0.45</td><td>0.46</td><td>0.47</td><td>0.48</td><td>0.49</td><td>0.50</td></tr> <tr><td>0.51</td><td>0.52</td><td>0.53</td><td>0.54</td><td>0.55</td><td>0.56</td><td>0.57</td><td>0.58</td><td>0.59</td><td>0.60</td></tr> <tr><td>0.61</td><td>0.62</td><td>0.63</td><td>0.64</td><td>0.65</td><td>0.66</td><td>0.67</td><td>0.68</td><td>0.69</td><td>0.70</td></tr> <tr><td>0.71</td><td>0.72</td><td>0.73</td><td>0.74</td><td>0.75</td><td>0.76</td><td>0.77</td><td>0.78</td><td>0.79</td><td>0.80</td></tr> <tr><td>0.81</td><td>0.82</td><td>0.83</td><td>0.84</td><td>0.85</td><td>0.86</td><td>0.87</td><td>0.88</td><td>0.89</td><td>0.90</td></tr> <tr><td>0.91</td><td>0.92</td><td>0.93</td><td>0.94</td><td>0.95</td><td>0.96</td><td>0.97</td><td>0.98</td><td>0.99</td><td>1.00</td></tr> </table> <p>0.23 could equal $0 + 0.20 + 0.03$ $0 + 2/10$ and $3/100$ $0 + 23/100$ If children need to return back to the example of using money in a hundred square to revise decimal notation.</p>	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	 $0.3 = \frac{3}{10} = \frac{30}{100}$	<p>Place fractions and decimals on numberlines</p>  <p>Show tenths and hundredths in different ways.</p> <p>Complete the table.</p> <table border="1" data-bbox="1630 774 1937 911"> <thead> <tr> <th>Concrete</th> <th>Decimal</th> <th>Decimal - expanded form</th> <th>Fraction</th> <th>Fraction - expanded form</th> <th>In words</th> </tr> </thead> <tbody> <tr> <td></td> <td>3.24</td> <td>$3 + 0.2 + 0.04$</td> <td>$3 \frac{24}{100}$</td> <td>$3 + \frac{2}{10} + \frac{4}{100}$</td> <td>Three ones, two tenths and four hundredths.</td> </tr> <tr> <td></td> <td>3.01</td> <td></td> <td>$3 \frac{1}{100}$</td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>$3 + \frac{1}{10} + \frac{2}{100}$</td> <td>Two ones, three tenths and two hundredths.</td> </tr> </tbody> </table>	Concrete	Decimal	Decimal - expanded form	Fraction	Fraction - expanded form	In words		3.24	$3 + 0.2 + 0.04$	$3 \frac{24}{100}$	$3 + \frac{2}{10} + \frac{4}{100}$	Three ones, two tenths and four hundredths.		3.01		$3 \frac{1}{100}$							$3 + \frac{1}{10} + \frac{2}{100}$	Two ones, three tenths and two hundredths.
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10																																																																																																																						
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20																																																																																																																						
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30																																																																																																																						
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40																																																																																																																						
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50																																																																																																																						
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60																																																																																																																						
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70																																																																																																																						
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80																																																																																																																						
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90																																																																																																																						
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00																																																																																																																						
Concrete	Decimal	Decimal - expanded form	Fraction	Fraction - expanded form	In words																																																																																																																										
	3.24	$3 + 0.2 + 0.04$	$3 \frac{24}{100}$	$3 + \frac{2}{10} + \frac{4}{100}$	Three ones, two tenths and four hundredths.																																																																																																																										
	3.01		$3 \frac{1}{100}$																																																																																																																												
				$3 + \frac{1}{10} + \frac{2}{100}$	Two ones, three tenths and two hundredths.																																																																																																																										
<p>recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator 100 as a decimal fraction</p>	<p>Use blank hundred squares to introduce the concept of %. Explain that it means out of 100. Using if the World were a Village book and resources to explore percentages in a real life context.</p> <p>Once percentages have been introduced, you can relate them to decimals and fractions when counting on the hundred square or bead string,</p>	<p>Use if the World were a Village book to find out about countries in the world and the percentage of people from each county who have TV or clean water. Represent information on blank hundred squares showing the percentage and related fraction and decimal.</p> <p>People in the world who have clean water</p>  <div data-bbox="1218 1249 1451 1428" style="border: 1px solid black; padding: 5px;"> <p>Key 29% $\frac{29}{100}$ 0.29 do not have clean water.</p> </div>	<p>Relate percentages to fractions and decimals.</p> <p>$25\% = 0.25$ or $25/100$</p>																																																																																																																												

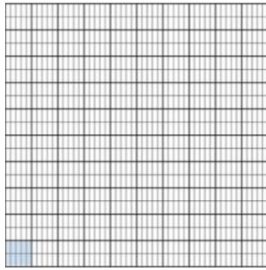


recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents

Explore the relationships between tenths, hundredths and thousandths using place value counters.



Use hundred squares split into thousandths

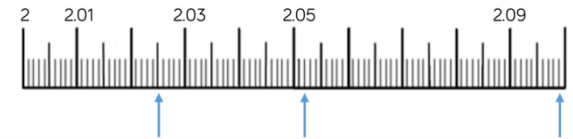


Use the thousand square to shade and identify the fraction and decimal in the same way as the hundredths.

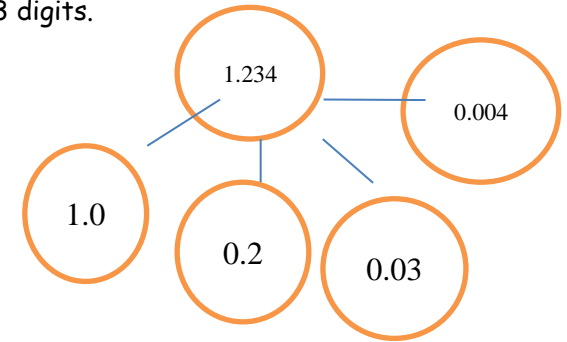
Draw decimal numbers to 3 digits using place value grids. Use place value counters or draw counters.



Use number lines to place thousandths.



Use part whole models to partition decimals in 3 digits.



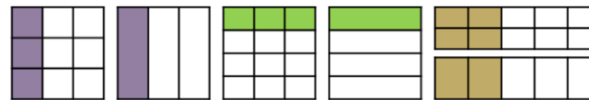
identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths

Use Cuisenaire rods/fraction wall to compare fractions and show families of any equivalent fractions; decide which rod or length of whole to start with to show families of fractions. Link to factors and multiples. E.g. decide to use a 12 rod or length to show thirds and twelfths. (The pairs of factors of 12 are 3 and 4, 2 and 6)

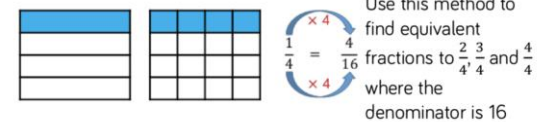


Link concrete understanding to abstract method.

Use the models to write equivalent fractions.



Use the rectangular model and concrete resources then to support the understanding of the abstract method.





Caversham Park Primary School Calculation Policy

add and subtract fractions with the same denominator and multiples of the same number

Use Cuisenaire rods/fraction walls to add and subtract fractions in the same fraction family. Use bar models to add fractions with the same denominator as in Year 4

Here is a bar model to calculate $\frac{3}{5} + \frac{4}{5}$



$$\frac{3}{5} + \frac{4}{5} = \frac{7}{5} = 1 \frac{2}{5}$$

$$\frac{7}{8} - \frac{3}{8}$$

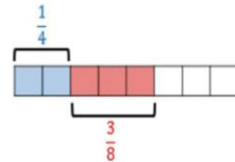


Use bar models to add fractions with different denominators. Children will need a good understanding of equivalence. Relate to abstract equivalence model. How many eighths is $\frac{1}{4}$?

Adding



$$\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$

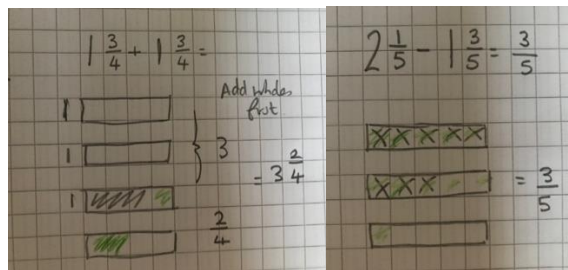


Subtracting



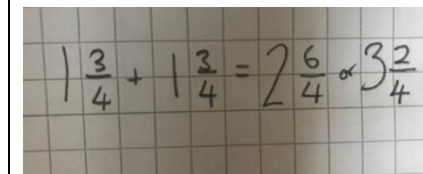
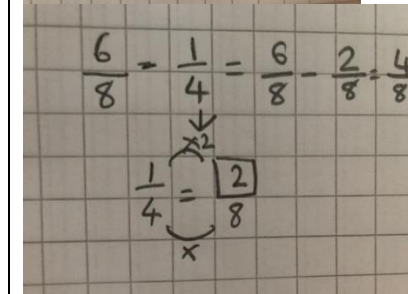
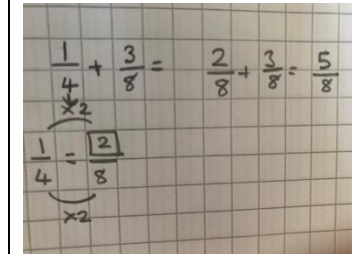
This can be extended to adding 3 fractions.

Children add and subtract mixed numbers by drawing bar models



If children are able they can be extended to adding mixed and improper fractions with denominators from the same family. They will need to have a good understanding of both equivalence and addition for this.

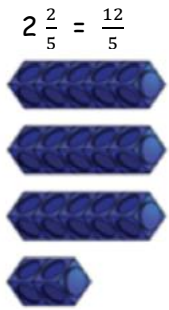
Use the abstract model to add fractions which are in the same families.



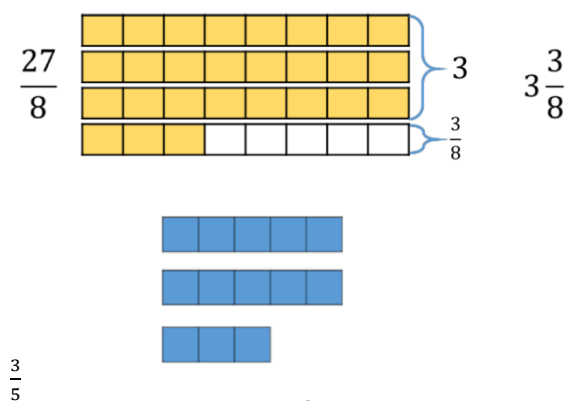


recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$)

Use multilink cubes/fraction walls/Cuisenaire rods to explore mixed and improper fractions.
Use cubes to make::



Draw bar models to convert improper fractions to mixed numbers



Use knowledge of times tables to convert mixed and improper fractions to whole numbers and visa versa.

$2\frac{3}{5} = \frac{13}{5} (2 \times 5 + 3)$

$\frac{13}{5} = 2\frac{3}{5} (5 \times 2 + 3)$

multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

Use practical resources such as Cuisenaire rods to multiply fractions.

Use bar models to show how fractions are multiplied

Work out $\frac{1}{6} \times 4$ by counting in sixths.

$\frac{1}{6} \times 4 = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$

$\frac{1}{5} \times 4 = \frac{4}{5}$

Apply this method to non-unit fractions
Count the number of ninths to work $3 \times \frac{2}{9}$

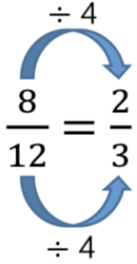




Children may move onto abstract but only if they have a complete understanding of what is happening when we multiply a fraction by a whole number.

$\frac{1}{5} \times 4 = \frac{4}{5}$



Written Calculation Policy Overview

Fractions- Year Six Only

Objective	Concrete	Pictorial	Abstract
<p>use common factors to simplify fractions; use common multiples to express fractions in the same denomination</p>	<p>If children do not understand equivalence in the abstract model then they will have to go back to Year 5 concrete and pictorial methods.</p> <p>If not then they can use this to simplify.</p>	<p>Simplify $8\frac{8}{12}$ by thinking about the common factors</p> <p>Factors of 8: 1, 2, 4, 8 Factors of 12: 1, 2, 3, 4, 6, 12 4 is the highest common factor.</p>	
<p>multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)</p>	<p>Understand that in this equation \times means of:</p> <p>So $\frac{1}{2} \times \frac{1}{4} = \frac{1}{2}$ of $\frac{1}{4} =$</p> <p>Use fraction wall strips to explore what $\frac{1}{2}$ of a $\frac{1}{4}$ would be.</p> 	<p>Understand that in this equation \times means of:</p> <p>So $\frac{1}{4} \times \frac{1}{2} = \frac{1}{4}$ of $\frac{1}{2} =$</p> <p>Draw bars to show:</p>  <p>$\frac{1}{4} \times \frac{1}{2} = \frac{1}{4}$ of $\frac{1}{2} = \frac{1}{8}$</p>	<p>Understand that in this equation \times means of:</p> <p>So $\frac{1}{4} \times \frac{1}{2} = \frac{1}{4}$ of $\frac{1}{2} =$</p> <p>Understand short cut times top by top and bottom by bottom.</p>
<p>divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)</p>	<p>$\frac{1}{3} \div 2 = \frac{1}{6}$</p> <p>Use fraction wall strips to explore what Use fraction wall strips to explore what $\frac{1}{3} \div 2$ would be.</p> 	<p>Draw bars to show:</p> <p>$\frac{1}{3} \div 2 = \frac{1}{6}$</p> 	<p>Understand kiss and flip it method</p> <p>$\frac{1}{3} \div 2 =$ $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$</p>



Caversham Park Primary School Calculation Policy