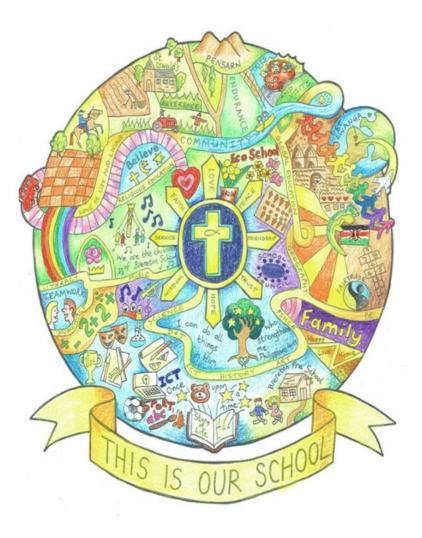


Chester Diocesan Academies Trust

Year 3

Maths Calculation Policy



#### Addition

Year 3	<ul> <li>Add numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds.</li> <li>Add numbers with up to three digits, using formal written methods of columnar addition.</li> <li>Add fractions with the same denominator within 1 whole.</li> <li>Calculate the time taken by particular events or tasks.</li> </ul>			
Progression of skills	Key representations			
Add 1s, 10s or 100s to a	The ones/tens/hundreds colu	mn will increase by	What patterns	do you notice?
<b>3-digit number</b> Emphasis on mental strategies including number bonds and related facts. Prompt children to notice which digit changes.	HundredsTensOnesHundredsIIIIIIIIHundredsIIIIIHundredsIIIIIIHundredsIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	H       T       O         Image: Constraint of the state of	235 + 3 = 235 + 30 = 235 + 300 = 604 + 20 = 604 + 50 = 604 + 90 + 90 = 604 + 90 = 604 + 90 = 604 + 90 = 604 + 90 = 604 + 90 = 604	$111 + \boxed{ = 118} \\ 111 + \boxed{ = 181} \\ 111 + \boxed{ = 811} $
Add two numbers	ones + ones = ones			?
(no exchange)	$\dots$ tens + $\dots$ tens = $\dots$ tens $\dots$ hundreds + $\dots$ hundreds = $\dots$	hundreds	345	432
Mental strategies and introduction of formal written method.		Hundreds           345         432	Tens         Ones           Image: Construction of the second s	H     T     O       3     4     5       +     4     3     2       -     -     -     -

## Addition



Progression of skills	Key representations
Add two numbers across a 10 or 100 Formal written method involving up to 2 exchanges including 3-digit plus 2-digit numbers.	There are ones, so I do/do not need to make an exchange. There are tens, so I do/do not need to make an exchange. ones = ten and ones. tens = hundred and tens. 255   54
<b>Complements to 100</b> Pairs of numbers which total 100	plus is equal to 100 $ \begin{array}{c} 1 \text{ add } \dots \text{ to get to the next 10, then } \dots \text{ to get to 10} \\ 100 \\ 38 \\ 38 \\ 7 \end{array} $ $ \begin{array}{c} 38 + 62 = 100 \\ 62 + 38 = 100 \\ 100 = 38 + 62 \\ 100 = 62 + 38 \end{array} $

## Addition



Progression of skills	Key representations
Add fractions with the same denominator within 1 whole Make links with known facts.	When adding fractions with the same denominator, I only add the numerator. fifths + fifths = fifths 1 + 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =
Calculate the duration of events Find durations of time between a given start and end point. Children will need to calculate complements to 60	From to o'clock is minutes. From o'clock to is minutes. The total time taken is minutes. $ \underbrace{4:25}_{\text{finish}} \underbrace{4:55}_{\text{finish}} \underbrace{2:25}_{3:00} \underbrace{3:18}_{3:18} $

#### **Subtraction**



Year 3	<ul> <li>Subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds.</li> <li>Subtract numbers with up to three digits, using formal written methods.</li> <li>Subtract fractions with the same denominator within 1 whole.</li> </ul>		
Progression of skills	Key representations		
Subtract 1s, 10s and 100s from a 3-digit number Emphasis on mental strategies including number bonds and related facts. Prompt children to notice which digit changes.	The ones/tens/hundreds column will decrease byH T OImage: Second Secon	What patterns do you notice? $235 - 3 =$ $235 - 30 =$ $235 - 300 =$ $118  624 - 20 =$ $654 - 50 =$ $694 - 90 =$ $811  =$ $235 - 300 =$ $235 - 300 =$ $=$	
Subtract two numbers (no exchange) Mental strategies and introduction of formal written method.		769         147       ?         ndreds       Tens       Ones         Q	

#### **Subtraction**



Progression of skills	Key representations	
Subtract two numbers across a 10 or 100 Formal written method involving up to 2 exchanges including 3-digit subtract 2-digit numbers.	I need to subtract ones. I do/do not need to I need to subtract tens. I do/do not need to I can exchange 1 for 10 $\boxed{72}_{45}$ ? $\boxed{100}_{2}$	U U
Complements to 100	100 minus is equal to	I subtract tens, then I subtract ones.
Focus on subtraction facts. Encourage children to notice patterns.		100 - 38 = 62 $100 - 62 = 38$ $62 = 100 - 38$ $38 = 100 - 62$ $38 = 100 - 62$

#### **Subtraction**



Progression of skills	Key representations
Subtract fractions with the same denominator within 1 whole	When subtracting fractions with the same denominator, I only subtract the numerator. fifths – fifths $\frac{7}{5} - \frac{1}{5}$
Make links with known facts.	$\frac{4}{5} - \frac{1}{5}$
	$\frac{3}{5} - \frac{1}{5}$

Year 3	<ul> <li>Recall and use multiplication facts for the 3, 4 and 8 multiplication tables.</li> <li>Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.</li> <li>Solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</li> </ul>		
Progression of skills	Key representations		
The 3 times-table Encourage daily counting in multiples both forwards and back.	groups of $3 =$ $\times 3 =$ 3, times = $3 \times =$ 3 3 3 3 3	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
The 4 times-table Encourage daily counting in multiples both forwards and back. Encourage children to notice links between the 2 and 4 times-tables.	$\begin{array}{c} \dots \text{ groups of } 4 = \\ \dots \times 4 = \\ 4, \dots \text{ times } = \\ 4 \times \dots = \end{array} \qquad \qquad$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	



Progression of skills	Key representations
The 8 times-table	lots of 8 = times 8 is equal to
Encourage daily counting in multiples both forwards and	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
back. Encourage children to notice links between the 2, 4 and 8 times-tables.	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
Related facts Use knowledge of multiplying by 10 to scale times-table facts.	$\times$ ones is equal to ones so $\times$ tens is equal to tens. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Multiply a 2-digit number by a 1-digit number - no exchange Children apply their understanding of partitioning to represent and solve calculations using the expanded method.	In tens multiplied by is equal to tens.Image: Image: I

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Progression of skills	Key representations	
Multiply a 2-digit number by a 1-digit number - with exchange Children apply their understanding of partitioning to represent and solve calculations using the expanded method.	tens multiplied by is equal to tens.Tens OnesTens OnesCones <th< th=""><th><math display="block">45 \times 3</math> <math display="block">40 \times 3</math> <math display="block">5 \times 3</math> <math display="block">\boxed{10000}</math> <math display="block">100</math></th></th<>	$45 \times 3$ $40 \times 3$ $5 \times 3$ $\boxed{10000}$ $100$
Scaling Children focus on multiplication as scaling ( times the size) as opposed to repeated addition.	There are times as many as 2 $\triangle \triangle \triangle \triangle \triangle \triangle 2 2 2$ There are 3 times as many triangles as circles.	<ul> <li> is times the size of</li> <li> is times the length/height of</li> <li>4 cm</li> <li>16 cm</li> <li>Miss Smith is twice the height of Jo.</li> </ul>



Progression of skills	Key representations			
Correspondence problems (How many ways?)	For every , there are possible There are $\times$ possibilities altogether.			
		hats	scarves	
Encourage children to work systematically to find all the		blue 🍂	ALLER AND	For every hat, there are two possible
different possible combinations.		orange 為	ALL OF	scarves. $3 \times 2 = 6$
		purple 🚔		There are 6 possibilities altogether.



Year 3	<ul> <li>Recall and use division facts for the 3, 4 and 8 multiplication tables.</li> <li>Write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.</li> <li>Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</li> </ul>		
Progression of skills	Key representations		
Divide by 3 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are groups of 3 in $\div$ 3 = $2 \times 3 = 6$ $6 \div 3 = 2$ 0 1 2 3 $2 \times 3 = 6$ $6 \div 3 = 2$	has been shared equally into 3 equal groups. $\div 3 =$ $2 \times 3 = 6$ $6 \div 3 = 2$ $6 \div 6$ $2 \times 2$ $2 \times 3 = 6$ $6 \div 3 = 2$	
Divide by 4 Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are groups of 4 in $\div 4 =$ $2 \times 4 = 8$ $8 \div 4 = 2$ 0  1  2  3  4  5  6  7  8	has been shared equally into 4 equal groups. $\div 4 =$ $2 \times 4 = 8$ $8 \div 4 = 2$ $8 = 8$ $2 = 2$	



Progression of skills	Key representations	
<b>Divide by 8</b> Encourage children to compare the grouping and sharing structures of division and to make links with times-table facts.	There are groups of 8 in $\div 8 =$ $2 \times 8 = 16$ $16 \div 8 = 2$ $0 \times 8 = 16$	has been shared equally into 8 equal groups. $\div 8 =$
		$8$ $2 \times 8 = 16$ $16 \div 8 = 2$
Related facts	$\dots \div \dots$ is equal to $\dots$ , so $\dots$ tens $\div \dots$ is equal to $\dots$ tens.	
Link to known times-table facts.		$\begin{array}{c} 1 & 1 & 1 \\ \hline 1 & 1 \\ \hline$
Divide a 2-digit number by a 1-digit number - no	tens divided by is equal to tens. ones divided by is equal to ones.	
<b>exchange</b> Partition into tens and ones to divide and then recombine.	Tens         Ones $60 \div 2 = 3$ $4 \div 2 = 2$ $64 \div 2 = 3$	



Progression of skills	Key representations	
Divide a 2-digit number by a 1-digit number - with remainders Encourage children to partition numbers flexibly to help them to divide more efficiently.	Tens divided by is equal to tens ones divided by is equal to ones.TensOnes96 $\div$ 480 $\div$ 416 $\div$ 496 $\div$ 496 $\div$ 496 $\div$ 4	There are groups of There are remaining. $31 \div 4 = 7 r3$ 4 = 7 r3 4 = 7 r3 7 = 11 = 15 = 19 = 23 = 27 = 31 $94 \div 4 = 23 r2$ 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 19 = 23 = 27 = 31 1 = 15 = 10 = 10 1 = 15 = 10 = 10 1 = 15 = 1
Unit fractions of a set of objects Bar models are useful to show the link between division and fractions, for example, dividing by 3 and finding a third.	The whole is divided into equal parts. Each part is $\frac{1}{0}$ of the whole. 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 +	One of is $\frac{1}{4}$ of 12 is 3 $\frac{1}{3}$ of 36 is 12 13 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1



Progression of skills	Key representations	
Non-unit fractions of a set of objects Bar models are a useful representation and show the links with division and multiplication.	The whole is divided into equal parts. Each part is $\frac{1}{0}$ of the whole. 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 + 4 +	$\frac{1}{2} \text{ of } \dots \text{ is } \dots, \text{ so } \xrightarrow{1} \text{ of } \dots \text{ is } \dots$ $\frac{3}{4} \text{ of } 12 \text{ is } 9$ $\frac{2}{3} \text{ of } 36 \text{ is } 24$ $10 \text{ 1 } 10 \text{ 1 } 10 \text{ 1 } 1$