



This policy supports the White Rose Maths Scheme that we use throughout the whole school. Progression within the four calculations, across each year group, is in line with the 2014 National Curriculum. The calculation policy should be used to support children to develop a solid understanding of number and calculation. It has been designed to teach children using concrete, pictorial and abstract methods and representations.

Concrete representations – This is a 'hands on' component, using real objects (e.g. cars, animals, cubes etc.) and it is the foundation for conceptual understanding.

Pictorial representations – When a pupil has a sound understanding of the concrete stage, they are introduced to pictorial representations, such as pictures, models and diagrams of the calculation or problem.

Abstract representation – At this stage, a pupil will be capable of representing calculations and problems by using mathematical notation (e.g. 6+5 or 4x3 etc.).

It is important that conceptual understanding, supported by the use of representations, is secure for all procedures. When introducing a new calculation or rule, it is essential to start with concrete representations.

# **EYFS**

#### Statutory framework for the early years foundation stage (Early Learning Goals)

*Number* - Have a deep understanding of number to 10, including the composition of each number; 14 - Subitise (recognise quantities without counting) up to 5; - Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns - - Verbally count beyond 20, recognising the pattern of the counting system; - Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; - Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.





All things are possible if you believe Mark 9:23



National Curriculum

Pupils should be taught to:

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

Represent and use number bonds and related subtraction facts within 20.

Add and subtract one-digit and two-digit numbers to 20, including zero.

Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = -9.

Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.





All things are possible if you believe Mark 9:23





Multiplication as repeated addition.	Use different objects to add equal groups.	Five added together six times is Five added together six times is $Five added together six times is Five added together six times is$
Multiplication in arrays.	Create arrays using counters/ cubes to show multiplication sentences.	Any         Description - columns         Description - news         Exists           Solution         Scatures         2 news         2 - 2 + 2 + 2 + 2 - 10         5 + 5 + 10           Solution         index column         Scatures         Scatures         - columns
	4+4+4+4 = 20 Teddy Alex 5+5+5+5=20	
Doubling, using toys, cars, cubes, counters, straws, tens frames, Base 10, pictures etc.	Double is a number.	Build       Represent       Add       Double         Image: State
Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	There are are there altogether?	Tom has these balloons.
	Division	
Sharing, using toys, cars, cubes, counters, straws, tens frames, Base 10, pictures, arrays etc.	I have 10 cubes, can you share them equally in 2 groups?	<ul> <li>a) Share the counters between 2 friends. How many counters does each friend get2</li> </ul>

All things are possible if you believe Mark 9:23



National Curriculum

Pupils should be taught to:

Solve problems with addition and subtraction:

- using concrete objects and pictorial representations, including those involving numbers, quantities and measures.
- applying their increasing knowledge of mental and written methods.

Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.

Add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers

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

Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals (=) signs.

Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.



All things are possible if you believe Mark 9:23









Subtraction		
Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100.	100 - 37 = 63 20 - 1 = 19 100 41	
Subtracting a two-digit number and ones, using concrete objects, pictorial representations and mentally. <u>With and without regrouping.</u>	22 - 7= 1 -1 -1 -1 -1 -1 -1 -1 15 16 17 18 19 20 21 22 Can you put the larger number in your head and count back the smaller number? Start at 22 and count back 7	
	19-7=         Pupils will physically subtract (remove) 7 when using concrete apparatus. Pupils will cross 7 out when it is presented as a picture.         1	
Subtracting a two-digit number and tens, using concrete objects, pictorial representations and mentally.	Use 100 square to find 10 less.         1       2       8       4       5       6       7       8       9       10         11       12       13       14       15       16       17       18       19       20         21       22       23       24       25       26       27       28       29       30         31       32       33       34       35       36       37       38       39       40         41       42       43       44       45       46       47       48       49       50         51       52       53       54       55       56       57       58       59       60         61       62       63       64       65       66       7       88       89       90         91       92       93       94       95       96       97       98       99       100         1       92       93       94       95       96       97       98       99       100         1       92       93       94       95       96       97       98       91       100	
Subtracting two two-digit numbers, using concrete objects, pictorial representations and mentally. <u>No regrouping required.</u>	Subtract 13 from 28 $-\frac{1}{3}$ $\frac{3}{4}$ Pupils will physically subtract (remove) 13 when using concrete apparatus. Pupils	
	will cross 13 out when it is presented as a picture.	
Subtracting two two-digit numbers, using concrete objects, pictorial representations and mentally. <u>Regrouping required.</u>	Take 16 away from 34 $ \begin{array}{c} 2 \\ -1 \\ 6 \\ 1 \\ 8 \end{array} $ Subtract 12 What number is left? $27$ 39 $-12 = 27$	







National Curriculum

Pupils should be taught to:

Add and subtract numbers mentally, including:





Schoo

Diocese of Chest

- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds

Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.

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

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

Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.

Write and calculate mathematical statements for multiplication and 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.

Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.



All things are possible if you believe Mark 9:23





**1**ottran

C.E.School



All things are possible if you believe Mark 9:23



subtraction.



All things are possible if you believe Mark 9:23

Calculate the difference between 391 and 186.

391

186







Multiplication		
Recall and use multiplication facts for the 3, 4 and 8 multiplication tables.	3+3+3+3+3=18 6x3=18 6 groups/lots of 3 is 18	
	4+4+4+4=20 5x4=20 5 groups/lots of 4 is 20	
	8+8+8=32 4x8=32 4 groups/lots of 8 is 32	
3, 4 and 8 multiplication tables as arrays.	4x5/5x4 8x4/4x8 3x5/5x3 Pupils will draw arrays. 4x2/2x4	
Multiplying a two-digit number by a one-digit numbers, using mental methods and progressing to formal written methods.	No regrouping requiredChildren to represent the counters pictorially.Children to record what it is they are doing to show understanding.Formal column method with place value counters $10s$ $1s$ $3 \times 23$ $10s$ $1s$ $00$ $000$ $000$ $00$ $000$ $000$ $23$ $203$ $500$ $23$ $23$ $\frac{\times 3}{369}$	
	Regrouping requiredFormal column method with place value counters. $6 \times 23$ Formal written method $1005$ $105$ $15$ $1005$ $105$ $15$ $1005$ $105$ $15$ $1005$ $105$ $15$ $1005$ $105$ $15$ $11$ $11$	
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.	There are 3 purple bolloons. Complete the bar model to show how many pink balloons there are. Purple 3 pink 3 3 3 3 I A	
Division		



All things are possible if you believe Mark 9:23





National Curriculum

Pupils should be taught to:

Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.

Estimate and use inverse operations to check answers to a calculation.

Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Recall multiplication and division facts for multiplication tables up to  $12 \times 12$ .

Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers.

Recognise and use factor pairs and commutativity in mental calculations.

Multiply two-digit and three-digit numbers by a one-digit number using formal written layout.

Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.





All things are possible if you believe Mark 9:23







All things are possible if you believe Mark 9:23





	5x32=160 Pupils use the place value counters to multiply and regroup/exchange.	
	Hundreds Tens Ones H T O	
Solve problems involving	Pupils will use the column method to solve given problems. For example:	
multiplying and adding,	A lorry driver travels 156 km per day.	
including using the distributive	How many kilometres will the lorry driver have travelled	
numbers by one digit, integer	after 3 days?	
scaling problems and harder	168	
correspondence problems such	400	
as n objects are connected to	<i>X A</i>	
m objects.	A pizzeria offers a choice of bases and toppings.	
	Pizza base Toppings	
	thin chicken	
	onion	
	peppers	
	Complete the multiplication to work out how many different	
	combinations of pizza there are.	
	Complete the sentence.	
	There are combinations of pizza.	
Division		
Recall division facts for		
multiplication tables up to 12 ×	14÷/=2	
12.		
Use place value, known and		
derived facts to divide	40 ÷ 10 =	
mentally, including: dividing by		
1.		
	16	
	16÷1=16	

All things are possible if you believe Mark 9:23





#### Year 5 National Curriculum

Pupils should be taught to:

Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).

Add and subtract numbers mentally with increasingly large numbers.

Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.

Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19.

Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.

Multiply and divide numbers mentally drawing upon known facts.

Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.

Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3).

Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.

Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.

Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.



All things are possible if you believe Mark 9:23





.Schoo









Subtraction			
Subtract whole numbers with more than 4 digits, including	No regrouping required         Th         H         T         O		
using formal written methods (columnar subtraction).	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		
	Regrouping required         7       3       1       5         -       3       2       4       1         4       7       4       1       5         -       5       4       2       0         1       8       9       5         -       1       8       9       5		
Subtract numbers mentally with increasingly large numbers.	Pupils will complete calculations mentally, for example: 19,725-1,614 = 18,111 50nes - 4 ones = 10ne 2 tens - 1 ten = 1 ten 7 hundreds - 6 hundreds = 1 hundred 19 thousand - 1 thousand = 18 thousand 19 thousand - 1 thousand = 18 thousand		
Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.	16,094 - 12,896 = $\int_{to}^{ts} close$ $\int_{to}^{ts} close$ $\int_{to}^{ts} close$ 16,000 - 13,000 = 3,000		
Multiplication			
Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers	No regrouping required         Complete the sentences to describe the multiplication.         Image: Complete the sentences to describe the sentences to de		



All things are possible if you believe Mark 9:23



C.E.Schoo

Diocese of Chest



![](_page_26_Picture_0.jpeg)

![](_page_26_Picture_1.jpeg)

![](_page_26_Figure_2.jpeg)

![](_page_27_Picture_0.jpeg)

![](_page_27_Picture_1.jpeg)

National Curriculum

Pupils should be taught to:

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.

Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.

Perform mental calculations, including with mixed operations and large numbers.

Identify common factors, common multiples and prime numbers.

Use their knowledge of the order of operations to carry out calculations involving the four operations.

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Solve problems involving addition, subtraction, multiplication and division.

Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Addition and Subtraction					
Perform mental calculations, including with mixed operations and large numbers.	Pupils will look for relationships. Pupils may use related facts and/or partition and round numbers to solve mental calculations.				
	620 +	550·	- 150 = 8	30 x 9 ÷ 6 =	99cm x 5
	620 +	400 :	= 1,200 8	3 x 9 = 72 x 10 = 720 ÷ 6 =	= 120 100 x 5 – 5 = 495
	1				
Use their knowledge of the	r				
order of operations to carry out calculations involving the four operations.	E I	B	Brackets	$10 \times (4 + 2) = 10 \times 6 = 60$	4 × (1 + 2)
		Ι	Indices	5 + 2 <sup>2</sup> = 5 + 4 = 9	
		D	Division	10 + 6 ÷ 2 = 10 + 3 = 13	
	M A S	Μ	Multiplication	10 - 4 × 2 = 10 - 8 = 2	
		Α	Addition	10 × 4 + 7 = 40 + 7 = <b>47</b>	(3 + <u>2</u> ) × 2
		S	Subtraction	10 ÷ 2 - 3 = 5 - 3 = 2	

![](_page_28_Picture_0.jpeg)

![](_page_28_Picture_1.jpeg)

Solve addition and subtraction	Pupils will use mental and written methods to solve multi-step problems, for
multi-step problems in	example:
contexts, deciding which	
and why	I am thinking of a number. I add 200,000, then
	subtract half a million, then add
	a quarter of a million. Then I round to the nearest 10, which is
	two million and fifty.
	What number could Alex have been thinking of to start with?
	$ \xrightarrow{-7} + 200,000 \xrightarrow{-7} - 500,000 \xrightarrow{-7} + 250,000 \xrightarrow{-7} - 2,000,054 \xrightarrow{-50,000} \xrightarrow{-50,000} \xrightarrow{-7} - 2,000,054 \xrightarrow{-50,000} \xrightarrow{-7} - 2,000,054 \xrightarrow{-7} - 2,000,056 \xrightarrow{-7} - 2,000,000,000,000,000,000,000,000,000,0$
	Alex could have been thinking of $\frac{2,039,045}{-2,039,054}$
Use estimation to check	
answers to calculations and	$2 \times  9 \times 5 = 2l -  99ml - 399ml$
determine, in the context of a	L Visciose to to
degree of accuracy.	$2 \times 20 = 40$ 2000ml - 200ml - 400ml =
	L
	40 × 5 × 200 2 000m = 600mL = 1,400mL
	Apprex 2,000m - 000 Apprex.
	Multiplication and Division
Multiply multi-digit numbers up	IT TH TO HIM TH H TO
to 4 digits by a two-digit whole	4,036 2,305
written method of long	21. × 276
multiplication.	x 24 01 38 3 (1305)
	$161114036\times4$
	$+80.720(4,036 \times 20)$ 46 1,000( $\times$ )
	Place (03/180
	96,864 holder 050,100
Identify common factors	
common multiples and prime	Pupils will use mental methods and methods from previous year
numbers.	groups to identify common factors, common multiples and prime
	numbers. They will use this knowledge to solve problems, for
	example:
	Cross out all of the numbers that are NOT prime.
	<b>± 2 3 4 5 6 7 8 9 10 11 13 14 15 16 17 19 10 20</b>
	11         13         14         15         16         17         18         15         18           14         12         23         24         15         26         27         28         29         30
	31 32 33 34 35 36 37 38 39 40
	41 42 43 44 45 46 47 48 49 50
	Write the numbers in the sorting diagram.
	factors of 15 factors of 24
	$\wedge$ $\times$ 2 $\wedge$
	$\begin{pmatrix} 5 \end{pmatrix} \begin{pmatrix} 1 \end{pmatrix} \begin{pmatrix} 4 \end{pmatrix} \end{pmatrix}$
	$\begin{pmatrix} 3 \\ 24 \\ 6 \end{pmatrix}$
	Complete the sentence.
	The common factors of 15 and 24 are

![](_page_29_Picture_0.jpeg)

![](_page_29_Picture_1.jpeg)

![](_page_29_Figure_2.jpeg)

![](_page_30_Figure_0.jpeg)