Newquay Primary Academy



Calculation Policy

Author: Craig Hayes Adopted by (body): Local Governing Body Approved (date): 01/09/2022 Review date: 01/09/2024 This policy is intended to demonstrate how we teach different forms of calculation at Newquay Primary Academy. It is organised by year groups although some higher ability children may use methods from later year groups. In the KS2 tests at the end of year 6, children are expected to use written formal methods for all four operations (addition, subtraction, multiplication and division).

This policy is designed to help teachers and staff members at the school ensure that calculation is taught consistently across the school and to aid them in helping children who may need extra support or challenges.

This policy is also designed to help parents, carers and other family members support children's learning by letting them know the expectations for their child's year group and by providing an explanation of the methods used in our school.

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EYFS Mathematics

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Year	Curriculum Statutory Requirements	S	Strategies
EYFS	 ELG: Number Children at the expected level of development will: Have a deep understanding of number to 10, including the composition of each number; 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. 	Use cubes to build towers from 1 to 10. Can the children order the towers? What do they notice?	5 5 5 5 5 5 9 art 2 part 2 part
	 ELG: Numerical Patterns Children at the expected level of development will: 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. 	One more than 4 is 5.	

Year		
Year 1	 Year 1 Read, write and interpret mathematical statements involving addition (+) and equals (=) signs and relate this to balance sums and scales Represent and use number bonds and related subtraction facts within 20 Add one-digit and two-digit numbers to 20, including zero Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 9 = □ + 7. 	
Year 2	 Year 2 Solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures, and applying their increasing knowledge of mental and written methods Recall and use addition facts to 20 fluently, and derive and use related facts up to 100 Add 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 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. 	$\int_{30}^{40} \frac{1}{40} \frac{1}{40$
Vocabulary +, add, more, plus, make, sum, total, altogether, double, near double, one more, two more ten more, how many more to make? how many more is than? how much more is?		Key resources

Year	Curriculum Statutory	Steps to success	Strategies
	Requirements		
Year	By the end of the year,	Step 1	Using diennes to partition and count a total
3	pupils should be taught to:	 I can add a three-digit number and 1's mentally. 	I
	Add numbers mentally	- I can add numbers with up to 3-digit numbers	1001
	Including:	informally.	
	- a 3-digit number and tens	 I can begin to estimate the answer to a question. 	
	- a 3-digit number and	Step 2	Moving towards drawing pictorial representations of diennes and
	nundreds	- I can add a three-digit number and 10s	partitioning 3 digit numbers to add.
	• Add numbers with up to	(HTU+TU) mentally.	
	three digits, using formal	- I can add number with up to 3 digits using a	143+104=241 200 40 3
	written methods of	formally written method of columnar addition	+ 700 20 5
	columnar addition	without bridging ten.	900 60 8 = 968
		 I can estimate the answer to my calculation and say whether the answer is likely. 	Expanded column addition
	 Estimate the answer to a calculation and use 	and say whether the answer is likely.	466 + 358 =
	calculation and use		400 60 6
	check answers		+ 100 10
			800 20 4
	• Solve problems,	Step 3	Exploring expanded column method as they move towards the formal
	including missing	- I can add a three-digit number and 100s	compact column method.
	number problems, using	(HTU+HTU) mentally.	
	number facts, place	- I can add numbers with up to 3 digits using	215 1 3 2 + 2 9 = + 527
	addition	formal methods of columnar addition (moving	+ 122 + 36
		towards an understanding of bridging to	$\frac{+155}{100+50+11} = 161 \bigcirc $
		L can link number facts to other calculations	348
		(e + 6 + 8 = 14 + 6 = 14 + 14 - 6 = 8 + 14 - 8)	1
		=6).	
		- I can solve 1 step problems in context,	
		deciding which operation and methods to use	
		and why.	
		/ocabulary	Key resources
+, add,	, addition, more, plus, make, sum,	total, altogether, double, near double, one more,	
is the	an 2 how much more is 2	re, now many more to make? now many more	
=. equi	als. sign. is the same as		
+, add, two mo is th =, equa	, addition, more, plus, make, sum, pre ten more one hundred mo an? how much more is? als, sign, is the same as	 (e.g. 6 + 8 =14, 8 + 6 = 14, 14 - 6 = 8, 14 - 8 =6). I can solve 1 step problems in context, deciding which operation and methods to use and why. /ocabulary total, altogether, double, near double, one more, ore, how many more to make? how many more 	Key resources

Year	Curriculum Statutory	Steps to success	Strategies	
Year 4	Requirements (ear 4) By the end of the year, pupils should be taught to: • Add with up to 4 digits using the formal written methods of columnar	Step 1 I can add 3-digit numbers using columnar addition (including bridging 10). I can solve simple addition problems. 	Expanded column addition Id66 + 4868 = Id6 H T O 1466 + 4868 = Image: 1000 400 60 6 6 6 4000 20 7 1000 100 100 100 100 6 400 20 7 1000 100 100 100 100 6 6 6 6 700 60 12	
	 addition where appropriate. Estimate and use inverse operations to check answers to a calculation Solve two-step 	 Step 2 I can add 3-digit numbers using columnar addition (including bridging 10 and 100). I can find fact families for an addition fact. I am beginning to estimate the answer to a calculation I can solve one-step problems in contexts, deciding which operations to use and why 	$ \begin{array}{c} 215 \\ + 133 \\ 8 (5 + 3 = 8) \\ 40 (10 + 30 = 40) \\ \underline{300} (200 + 100 = 300) \\ 348 \end{array} $	
	problems addition in contexts, deciding which operations and methods to use and why.	 Step 3 I can add up to 4-digit numbers using columnar addition (including bridging 100) I can use inverses in number problems (e.g. I think of a number and add 3) I can estimate the answer to a calculation and say whether my answer is likely I can solve more complex one-step problems in contexts, deciding which operations to use and why 	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	
add, add more to inverse,	dition, more, plus, increase, su make? tens boundary, hund =, equals sign, is the same as	Vocabulary m, total, altogether, double, near double, how many reds boundary,	Key resources	

Year	Curriculum Statutory	Steps to success	Strategies
Year 5	Requirements By the end of the year, pupils should be taught to: • Add whole numbers with more than 4 digits, including using formal written methods (columnar addition)	 Step 1 I can add and subtract 4-digit numbers using columnar addition (including bridging 10/100/1000) I can add mentally a three-digit number and a single digit number I can solve one-step problems in contexts, deciding which operations to use and why 	NC – end of year 6 expected method (examples from NC) 789 + 642 becomes 789 + 642 becomes 1431 Answer: 1431
	 Add numbers mentally with increasingly large numbers Use rounding to check answers to calculations and determine, in the context of a problem. 	 Step 2 I can add and subtract 4-digit numbers using columnar addition (including bridging 10/100/1000) I can add mentally a three-digit number and a multiple of 10 I am beginning to use rounding to +estimate the answer to a calculation I can solve more complex one-step problems in contexts, deciding which operations to use and why 	To answer 3252 + 3700, I can round to the nearest hundred or thousand to estimate the answer. TTh Th H T O4 3 2 0 1.2 2 1 2 4+ 3 1 3 2 19 6 6 4 6
	 Solve addition multi- step problems in contexts, deciding which operations and methods to use and why 	 Step 3 I can add and subtract 4-digit numbers using columnar addition (including bridging 10/100/1000 I can add mentally a three-digit number and a multiple of a hundred I can estimate the answer to a calculation using rounding and say whether my answer is likely I can solve addition and subtraction two-step problems in contexts, deciding which operations to use and why 	The answer to this calculation is likely to be near £31 because $24 + 7 = 31$.
Vocabulary add, addition, more, plus, increase, sum, total, altogether, double, near double, how many more to make? inverse, primes, prime factors, composite numbers equals, sign, is the same as			Key resources

Vear	Curriculum Statutory	Stone to suc	2202	Stratogios
i cai	Sumbulum Statutory	Sieps to suc		Silategies
	Requirements			

Year 6	By the end of the	Step 1	NC – end of year 6 expected method (examples from NC)
	year, pupils should	- I can add and subtract 5-digit numbers using columnar	789 + 642 becomes
	be taught to:	addition (including bridging 10/100/1000/10000).	
			789
	Solve addition		+ 6 4 2
	multi-step		
	problems in		1 4 3 1
	contexts,		1 1
	deciding which		Answer: 1431
	operations and		
	methods to use	Step 2	
		- I can add and subtract 5-digit numbers with decimals using	124.0
	 Solvo probloms 	columnar addition (including bridging 10/100/1000/10000).	The answer to this 124.9
	involving	- I can add and subtract multiples of 10 and 100 to three- and	
	addition	four-digit numbers mentally.	
		- I can use brackets in simple calculations.	Decause 125 + 115 = 747 15
	Use estimation to	- I can solve more complex one step problems in context	
	check answers to	deciding which operations to use and why.	11
	calculations and	- I can check whether my answer is likely.	
	determine, in the	Step 3	Numbers can be carried above or below but should be crossed
	context of a	 I can add and subtract numbers of different lengths with 	out when they have been added.
	problem, an	decimals using columnar addition (including bridging where	
	appropriate	necessary).	TTh Th H T O . t h
	degree of	- I can add and subtract numbers mentally with increasingly	4 5 5 . 5 2
	accuracy	large numbers.	
		- I can use brackets and inverses effectively e.g. (24+P) x 6 =	+ 2 0 5 2 8 . 2 0
		150.	
		- I can solve addition and subtraction twostep problems in	1
		context deciding which operations and methods to use and	2 0 9 8 3 . 7 2
		why.	
		- I can use rounding to check answers to calculations and	
		determine, in the context of a problem, levels of accuracy.	
		Vocabulary	Key resources
add, add	lition, more, plus, increase	e, sum, total, altogether, double, near double,	
how mar	ny more to make? invers	se, primes, prime factors, composite numbers	
equals, s	sign, is the same as		

Newquay Primary Academy Progression in Calculation – Subtraction

Year	Curriculum Statutory Requirements	Strategies

Year 1	 Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs Represent and use number bonds and related subtraction facts within 20 Subtract one-digit and two-digit numbers to 20, including zero Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 9 = □ - 7. 	There are 6 apples. 5 of them are red and 1 is green. 3 Write the fact family to show this. 0 1 2 3 4 5 6 7 8 9 10 9-3 =
Year 2	 Solve problems with 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 subtraction facts to 20 fluently, and derive and use related facts up to 100 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 Subtracting 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. 	The ten frames show 20 The ten frames show 20 Use the ten frames to work out the subtractions. 20-4 $20-7$ $20-220-280-4$ $80-7$ $80-280-4$ $80-7$ $80-280-2$
+, add, mor	Vocabulary e, plus, make, sum, total, altogether, double, near double, one more ow many more to make 2 how many more is than 2 how much	e, two more

Newquay Primary Academy Progression in Calculation – Subtraction

Year	Curriculum Statutory	Steps to success	Strategies
	Requirements		

Year 3	By the end of the year, pupils should be taught to: • Subtract numbers mentally, including: - a three-digit number and ones -a three-digit number and tens - a three-digit number and hundreds	Step 1 - I can subtract up to 3-digit numbers informally - I can begin to estimate the answer to a calculation	Count on to find the difference. Comparison Bar Models Draw bars to find the difference in age between them. Use is 13 years old. Her sister is 22 years old. Find the difference in age between them. the difference is the difference in age between them. Use a sister
	 Subtract numbers with up to three digits, using formal written methods of columnar subtraction Estimate the answer to a calculation and use inverse operations to check answers Solve problems, including missing 	Step 2 - I can subtract numbers with 2 digits, using formal written method of columnar subtraction without bridging 10 - I can estimate the answer to a calculation and say whether my answer is likely - I can solve simple subtraction problems	$\frac{47-24=23}{-\frac{420+7}{20+3}}$ This will lead to a clear written column subtraction. $\frac{32}{-\frac{12}{20}}$ $\frac{32}{-\frac{12}{20}}$
	number problems, using number facts, place value, and more complex subtraction.	Step 3 -I can subtract numbers with 3 digits, using the formal written method of columnar subtraction - I can make all related number sequences (e.g. 14 -6 = 8, 14 - 8 = 6, 6+8=14, 8+6=14) - Solve one step problems in context, deciding which operations and methods to use and why	247 - 122 = 125 This will lead to a clear written column subtraction $200+40+7$ 247 $100+20+2$ - 122 $100+20+5$ 125
Take (a ten less how m Hundr	away), leave, how many are left/le sHow many fewer isthan? I uch less is? Half, halve, Equals, s eds boundary	Vocabulary Ift over? How many have gone? One less, two less Difference between is the same as, Subtract, minus, ign, One hundred less, Tens boundary, Subtraction,	Key resources

Newquay Primary Academy Progression in Calculation - Subtraction

Year	Curriculum Statutory	Steps to success	Strategies
	Requirements		

Year	By the end of the year,	Step 1		
4	 Pupils should be taught to: Subtract with up to 4 digits using the formal written methods of columnar subtraction 	-I can subtract 3-digit numbers using columnar subtraction without bridging 10. - I can solve simple subtraction problems. Step 2 -I can subtract 3-digit numbers using columnar	346 - <u>120</u> <u>226</u>	Draw the counters onto a place value grid and a place value grid and
	 Estimate and use inverse operations to check answers to a calculation Solve subtraction two- step problems in contexts, deciding which operations and methods to use and why. 	 chere appropriate stimate and use nverse operations to heck answers to a alculation bolve subtraction two- tep problems in ontexts, deciding which operations and methods o use and why. - I can subtract 3-digit numbers using columnar methods. - I can find fact families for subtraction facts. - I can find fact families for subtraction facts. - I can solve one-step problems in contexts, deciding which operations to use and why. 		index wind you have s index wind you have the counters out as well a sclarfy showing the exchanges you make. $\frac{12}{2}$ $\frac{1}{7}$ $\frac{1}{2}$ $\frac{1}{7}$ $\frac{1}{2}$ $\frac{1}{7}$ $\frac{1}{2}$ $\frac{1}{7}$ $\frac{1}{10}$
		Step 3 -I can subtract up to 4-digit numbers using columnar methods. - I can use inverses in number problems (e.g. I think of a number and add 3). - I can estimate the answer to a calculation and say whether my answer is likely. - I can solve more complex one-step problems in contexts, deciding which operations to use and why.	Column subtraction 942—214 Compact Method Expanded method Method 900 40 2 942 200 10 4 - 214 700 20 8 728	
Take (a One le Subtra Subtra	away), leave, how many are left/le ss, two less ten lessHow mar ct, minus, how much less is? Half ction, Hundreds boundary, decrea	Vocabulary off over? How many have gone? ny fewer isthan? Difference between is the same as , halve, Equals, sign, one hundred less, Tens boundary ase, Inverse	5,	Key resources

Newquay Primary Academy Progression in Calculation - Subtraction

Year	Curriculum Statutory	Steps to success	Strategies
	Requirements		

Year 5	 By the end of the year, pupils should be taught to: Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction) 	Step 1 -I can add and subtract 3-digit numbers using columnar subtraction - I can solve one-step problems in contexts, deciding which operations to use and why	$\begin{array}{c c} \hline Column subtraction \\ \hline 942-214 & Compact \\ \hline Expanded method & Method \\ \hline 30 12 & 312 \\ 900 40 2 & 942 \\ \hline 200 10 4 & - 214 \\ \hline 700 20 8 & 728 \\ \hline \end{array}$
	 Subtract numbers mentally with increasingly large numbers Use rounding to check answers to calculations and determine, in the context of a problem, 	Step 2 - I can subtract 3-digit numbers using columnar subtraction - I am beginning to use rounding to estimate the answer to a calculation - I can solve more complex one-step problems in contexts, deciding which operations to use and why	NC - end of year 6 expected method (examples from NC) 874 - 523 becomes 874 - 523 $932 - 457$ becomes 932 - 457 becomes 932
	 Solve subtraction multi- step problems in contexts, deciding which operations and methods to use and why. 	Step 3 -I can add and subtract numbers up to 4 digits using columnar addition - I can estimate the answer to a calculation using rounding and say whether my answer is likely -I can solve addition and subtraction two-step problems in contexts, deciding which operations to use and why	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
Take (a One le as, Sul bounda	away), leave, how many are left/le ss, two less ten lessHow mar ptract, minus, how much less is? I ary, Subtraction, Hundreds bound	Vocabulary off over? How many have gone? hy fewer isthan? Difference between is the same Half, halve, Equals, sign, one hundred less, Tens ary, decrease, Inverse	Key resources

Newquay Primary Academy Progression in Calculation - Subtraction

Year	Curriculum Statutory	Steps to success	Strategies
	Requirements		

Year	By the end of the year,	Step 1	
6	pupils should be taught to: -I can solve subtraction problems		
	 Solve subtraction multistep problems in contexts, deciding which operations and methods to use and why. Solve problems involving subtraction Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy 	Step 2 - I can subtract multiples of 10 and 100 to three and four digit numbers mentally - I can use brackets in simple calculations - I can solve more complex one step problems in context deciding which operations to use and why - I can check whether my answer is likely	10-6.47 = 6(8-4) = 24 1. How will Maths Frog work out this subtraction? 2. Draft an empty number line jotting to show a hop from 6.47 to 6.5 then to 7 or one hop straight from 6.47 to 7. Then show a hop from 7 to 10. $400 + 0000 + 000 + 000 + 000 + 000 + 000 + 000 +$
		Step 3 -Subtract numbers mentally with increasingly large numbers -I can use brackets and inverses effectively e.g. (24+P) x 6 = 150 - I can solve addition and subtraction two-step problems in context deciding which operations and methods to use and why -I can use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	NC - end of year 6 expected method (examples from NC) $874 - 523$ becomes $932 - 457$ becomes $874 - 523$ $932 - 457$ becomes -523 $932 - 457$ becomes -523 -457 -523 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -457 -475 -475 Answer: 351 Answer: 475
Vocabulary Take (away), leave, how many are left/left over? How many have gone? One less, two less ten lessHow many fewer isthan? Difference between is the same as, Subtract, minus, how much less is? Half, halve, Equals, sign, One hundred less, Tens boundary, Subtraction, Hundreds boundary, Decrease, Inverse, Units boundary, Tenths boundary,			Key resources

Year	Curriculum Statu	tory Requirements	Strategies

Year 1	• Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Double 4 is 8
Year 2	 Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (x) 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. 	$\bigcirc \bigcirc $
	Vocabulary	Key resources

Year	Curriculum Statutory	Steps to success	Strategies
	Requirements		

Year 3	 By the end of the year, pupils should be taught to: Recall and use multiplication facts for the 3, 4 and 8 multiplication tables Write and calculate mathematical statements 	 Step 1 I can count in 2s and then double these to find multiples of 4. I can relate times table facts to multiples e.g. 2x3=6 so 2x30=60; 6÷2=3 so 60÷2= I can find a division fact from a multiplication fact. 	facts a of 10, =30. ation 5+5+5=15 3+3+3+3=15 $5 \times 3 = 15$ $3 \times 5 = 15$ 20 40 40 40 12 5 20 6 40 12
	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	 Step 2 I know my 5 x table and can count in 10 knowing that these are double 5x facts. I can mentally calculate TU x U and TU using my times table facts using jottings support I can find the associated number statem a given number fact. 	S $\div U$ to hents for x 30 5 20 60 Grid method x 3 20 60
	• Solve problems involving missing number problems involving multiplication including positive number scaling problems and correspondence problems where n objects are connected to m objects.	 Step 3 I can use my 2 and 4 times tables to fin I know my 3 times tables I can mentally calculate TU x U and TU using my times table facts I can use inverses in number problems E.g. I think of a number, double it and a The answer is 35. What was my number 	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
Lots o produc as (big halve, pairs, equal remain	Vocabu f, groups of, x, times, multiplication ct, once, twice, three times, four tir l, long, wide and so on), repeated share, share equally, one each, tw threes tens groups of, ÷, divide, division, divide inder, product.	Jlary n, multiply, multiplied by, multiple of, nes, five times ten times, times addition, array, row, column, double, wo each, three each, group in ed by, divided into, left, left over,	

 Year
 Curriculum Statutory Requirements
 Steps to success
 Strategies

Year 4	 By the end of the year, pupils should be taught to: Recall and use multiplication facts for multiplication tables up to 12 x 12 Use place value, known and derived facts to multiply mentally 	Step 1 I can recall multiplication and divisi the 2, 5 and 10 x table. I can multiply and divide using practices. 	on facts for xical	$\begin{array}{c} 7 \ U \\ 1 \ 5 \\ \times \ 4 \\ 2 \ 0 \ (5 \times 4) \end{array} \xrightarrow{\times} \\ 4 \ 0 \ (10 \times 4) \end{array}$	T U 1 5 4 6 0 2	=
	 Multiply mentally, including: x0 x1 and 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, including the distributive 	 Step 2 I can recall multiplication and division the 2, 3, 4, 5, 6, and 10 x table. I can find factors for numbers to 2 (investigated using factor trees). I can multiply and divide a two-dig a one-digit number using an inform (e.g. number line). I can multiply a whole number by 	sion facts for ?0 git number by mal method 10.	x 20 4	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	3 300 90 12 402
	law to multiply two-digit numbers by one digit including positive number scaling problems and correspondence problems where n	Step 3 - I can recall multiplication and divis	sion facts for	нт а 326	<u>2400</u> 3538	2 6
	objects are connected to m objects.	 I can use my multiplication tables calculate with multiples of ten I can find factors for numbers to 5 I can multiply and divide a two-dig a one-digit number using a forma 	knowledge to 50 git number by I layout	× <u>3</u> 18 <u>900</u> 978	x 9 1	<u>, 3</u> 7 8
Lots of produc	f, groups of, times, multiplication, i t,	ulary multiply, multiplied by, multiple of,		Key res	sources	

once, twice, three times, four times, five times ten times, times as (big, long, wide, and so on), repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each, group in pairs, threes tens, equal groups of, divide, division, divided by, divided into, divisible by, remainder, factor, quotient inverse	
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Newquay Primary Academy Progression in Calculation – Multiplication

Year Curriculum Statutory		Steps to success	Strategies
Requirements			
YearBy the end of the year, pupils should be taught to:5• Identify multiples and factors: all factor pairs of a number, common factors of two numbers, establish whether a number up to 100 is prime and recall prime numbers up to 19.• Multiply numbers up to four digits by a one or two-digits pumber up to reading the pumber up to read		 Step 1 I can find factors for numbers to 20. I can recall multiplication and division facts for the 2, 3, 4, 5, 6, and 10 x table. I can solve one-step problems in contexts, deciding which operations to use and why. Step 2 I can find factors for numbers to 50. I can recall multiplication and division facts for the 7, 8 and 9 x table. I can solve more complex one-step problems contexts, deciding which operations to use an why 	r $\frac{Variation ideas}{6 \times 7 =}$ $6 \times 70 =$ $60 \times 7 =$ $6 \times 70 =$ $0.6 \times 7 =$ $6 \times 700 =$ $0.6 \times 7 =$ 3 2 6 x_{13} in ad $9 7 8$
	 formal written method. Multiply 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, including using their knowledge of factors and multiples, squares and cubes 	 Step 3 I can recognise and use factor pairs and commutativity in mental calculations. I can recall multiplication and division facts up to 12x12. I can solve multiplication and division two-step problems in contexts, deciding which operations to use and why. I can solve problems involving multiplying an adding, including integer scaling problems. I can multiply numbers up to four digits by a one or two-digit number using a formal writte method. 	$ \begin{array}{c} 2 4 \\ X \frac{1 6}{14^2 4} \\ \frac{2 4 0}{3 8 4} \\ \end{array} $
Vocabulary Lots of, groups of, times, multiplication, multiply, multiplied by, multiple of, product, once, twice, three times, four times, five times ten times, times as (big, long, wide, and so on), repeated addition, array, row, column, double, halve, share, share equally, one each, two each, three each, group in pairs, threes tens, equal groups of, divide, division, divided by, divided into, divisible by, remainder, factor, quotient inverse. Divisible by, Factor, Quotient, Inverse			Key resources

Year Curriculum Statutory		Steps to success	Strategies						
	Requirements								
rear	By the end of the	Step 1	INC – end of year 6 expected method (examples from NC)						
0	be taught to:	- I can recall all times tables up to 12 x 12 and know related	Short multiplication						
	be taught to.	division facts.	24 × 6 becomes	342 × 7 becomes	2741 × 6 becomes				
	Perform mental	- Recall and use multiplication and division facts up to 12 x 12.	2 4	3 4 2	2 7 4 1				
	calculations.	- I can use knowledge of times tables and place value to multiply	× 6	× 7	× 6				
	including with	0.1 by 0 e.g. 0.6 x 4 = 2.4.	1 4 4	2 3 9 4					
	mixed operations		Answer: 144	Answer: 2394	Answer: 16 446				
	and large								
	numbers	Step 2	NC – end of ye	ear 6 expected method (examples from NC)				
		- I can I can multiply larger numbers (<10,000) by single-digit	Long multiplica	tion					
	Identify multi-	numbers using short multiplication.	24 × 16 becomes	124 × 26 becomes	124 × 26 becomes				
	digit numbers up	- Use place value, known and derived facts to multiply and	2 2 4	1 2 1 2 4	1 2 1 2 4				
	to 4 digits by a	divide mentally, including: multiplying by 1 and 0; dividing by	× 1 6	× 26	× 26				
		1; multiplying together three numbers.	2 4 0	2 4 8 0	7 4 4				
	long	- I know multiples, factors, square numbers prime numbers.	1 4 4	$\frac{7 4 4}{3 2 2 4}$					
	multiplication.	- I can use brackets in simple calculations.		1 1	1 1				
		- I can use knowledge of times tables and place value to	Answer: 384	Answer: 3224	Answer: 3224				
	 Identify common factors, common multiples and common prime numbers. Use their 	multiply TU.t by U e.g. $0.06 \times 4 = 0.24$.							
		- I can check whether my answer is likely.							
		Step 3		2 (2 1				
		 I can multiply decimals by a single-digit number using short 		5 0 • .	2 1				
		multiplication.	Х	1 7					
		- I can multiply and divide numbers mentally drawing on known	2 -	5 3 .	1 7				
	knowledge of the order of	Idulo.	2	4. 1.	+ /				
		- I can identify multiples and ractors, including infuling an factor	3	6 2 •	1 0				
	operations to	$_{-}$ L can use brackets and inverses effectively e.g. (24+P) x 6 -	6	1 5 • 4	5 7				
	carry out	150.	ž						
		- Multiply one-digit numbers with one decimal place by whole							
	Involving the four	numbers.							
	operations.	- I can use rounding to check answers to calculations and							
		determine, in the context of a problem, levels of accuracy.							
Vocabulary				Key resources					
Lots o	f, groups of, times, multipli	ication, multiply, multiplied by, multiple of, product, once, twice,							
three t	imes, four times, five time	s ten times, times as (big, long, wide, and so on), repeated							
addition, array, row, column, double, naive, share, share equally, one each, two each, three each,									
remair	nder. factor. quotient. inve	rse. Divisible by, Factor, Quotient, Inverse							

Year	Curriculum Statutory Requirements	Strategies						
Year 1	Solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg $15 \div 3 = 5$ $5 \times 3 = 15$						
Year 2	 Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables Recognising odd and even numbers Calculate mathematical statements for division within the multiplication tables and write them using the signs ÷ and = Show that multiplication of two numbers is commutative but division is not Solve problems involving division using materials, arrays, repeated addition, mental methods and division facts, including problems in contexts. 	15÷5=3 3x5=15 14÷3= Divide objects between groups and see how much is left over 40 pencils are shared equally between 5 children. Image: Comparison of the second seco						
		$\begin{array}{c} \bullet \\ \bullet $						
Vocabulary +, add, more, plus, make, sum, total, altogether, double, near double, one more, two more ten more, how many more to make? how many more is than? how much more is?		Key resources						

Year	Curriculum Statutory	Steps to success		Strategies
	Requirements			
Year 3	 By the end of the year, pupils should be taught to: Recall and use multiplication and division facts for the 3, 4, 8x tables. Write and calculate 	 Step 1 I know my 2, 5 and 10 times tables division facts and use these to solv I can find half of a given number us partitioning. I can relate multiplication/ division f multiples of 10, e.g. 2x3=6 so 2x30 so 60÷2=30 I can find a division fact from a multiple 	and related e problems. sing facts to $=60; 6\div 2=3$ tiplication fact	
	mathematical statements for division using the multiplication tables they know, including 2-digit divided by 1-digit using mental and progressing	Step 2 - I can count in 3, 4 and 8 * I can me calculate TU ÷ U using my times ta jottings to support and using my kn 10x to support me.	entally ble facts using owledge of	20÷5=? 5 x ? = 20
	 to formal written methods Solve problems, involving missing number problems, division, including positive number scaling problems and correspondence problems where n objects are connected to m objects. 	 Step 3 I know my 3, 4, 8 and 9 times table division facts. I can mentally calculate TU ÷ U usi table facts I can use inverses in number proble think of a number, double it and ad answer is 35. What was my numbe Solve problems, including missing problems, involving division, including integer scaling problems and correspondents in which n objects are conobjects 	s and related ng my times ems e.g. I d 5. The r? number ing positive spondence nnected to m	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?
Vocabulary Remainder, divisor, factor			Key resources	

Year Step 1 Find the inverse of the year, pupils should be taught to: I can recall multiplication and division facts for the 2, 3, 4, 5, 6, and 10 x table Find the inverse of multiplication and division sentences by creating four linking number sentences. • Recall multiplication and division facts to to 12 x 12. - I can recall multiplication and division facts for the 7, 8 and 9 x table - I can recall multiplication and division facts for the 7, 8 and 9 x table - I can divide to - and three-digit number so y one-digit number using a formal layout • Solve problems involving dividing a three-digit number by one-digit number using a formal layout. - I can recall multiplication and division facts for the 7, 8 and 9 x table - I can divide to - and three-digit numbers by one-digit number set to 20 - I can divide to - and three-digit numbers by one-digit number by one-digit number using a formal layout - I can recall multiplication and division facts for the 7, 8 and 9 x table - I can divide to - and three-digit numbers by one-digit number by one-digit number by one-digit number by one-digit number using a formal layout - I can divide a three-digit number by 0 and division facts for multiplication and division facts for numbers to 50 - I can divide a three-digit number by 10 and 100 with a whole number answer, explaining what is happening and why Vocabulary Vocabulary Key resources	Year	Curriculum Statutory	Steps to success	Strategies						
divisible, divisible by, factor, factor quotient, inverse, fact boxes, divisor	Year 4 divis	Requirements By the end of the year, pupils should be taught to: • Recall multiplication and division facts up to 12 x 12. • Use place value, known and derived facts to divide mentally, including dividing by 1. • Solve problems involving dividing a three-digit number by one-digit and number using a formal layout. • Vocabuse	Step 1 - I can recall multiplication and divisitive 2, 3, 4, 5, 6, and 10 x table - I can use place value to divide by 1 - I can divide a two-digit number by a number using an informal method Step 2 - I can recall multiplication and divisitive 7, 8 and 9 x table - I can find factors for numbers to 20 - I can divide two- and three-digit number using a formal layout Step 3 - I can recall multiplication and divisitive runner using a formal layout Step 3 - I can recall multiplication and divisitive runner using a formal layout Method step 3 - I can recall multiplication and divisitive runner using a formal layout I can find factors for numbers to 50 - I can divide a three-digit number by number using a formal layout (shor - I can divide a whole number by 10 a whole number answer, explaining happening and why ulary otient, inverse, fact boxes, divisor	on facts for and 10. a one digit on facts for mbers by one- on facts for v a one-digit t division) and 100 with g what is	Find the inverse of multiplication and sentences by cre- linking number set $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$ 21 484	of d division eating four entences. 28 7 7 28 7 7 4	7	7 1 7	8 3 2	

Year Curriculum Statutory Steps to su		Steps to success	U	Strategies
Year	By the end of the year,	Step 1		
5	 Identify multiples and factors, including: finding all factor pairs of a number common factors of two 	 I can find factors for numbers to 20 I can recall multiplication and division 3, 4, 5, 6, and 10 x table I can divide a two-digit number by a number using short division I can solve one-step problems in complex which operations to use and why 	on facts for the 2, a one-digit ontexts, deciding	98 ÷ 7 becomes 1 4 2
	numbers - know and use the	Step 2		7 9 8
	vocabulary of prime numbers and establish whether a number up to 100 is prime	 I can find factors for numbers to 50 I can recall multiplication and divis 8 and 9 x table I can divide a two-digit number by number using short division 		Answer: 14
	• Multiply and divide numbers mentally	- I can solve more complex one-step	problems in	
	drawing on known facts	Step 3	s to use and why	872 ÷ 4 becomes
	Divide numbers up to 4 digits by a one-digit number using a written method and interpret remainders appropriately for the context	 I can recognise and use factor pairs commutativity in mental calculation I can recall multiplication and division 12x12 I can divide a three-digit number by number using short division 	s and s on facts up to ⁄ a one-digit	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
	 Divide whole numbers and those involving decimals by 10, 100 and 1000. I can solve multiplication and divisi problems in contexts, deciding whi use and why I can solve problems involving multi adding, including integer scaling pro- 	on twostep ch operations to tiplying and oblems	Divide numbers up to 4 digits by a one-digit number using a written method and interpret remainders appropriately for the context.	
	 Solve problems involving division, including using their knowledge of factors and multiples, squares and cubes 			5 4 3 2
Vocabulary			Key resources	

Year Curriculum Statutory		Steps to success				Strat	egies			
Requirements		•					0			
Year	By the end of the	Step 1				0	e	*	2	
6	year, pupils should	 I can recall all times tables up to 12 x 12 ar 	nd know related			0	0	I	2	
	be laught to.	division facts.	v 10				3			
	Perform mental	- I can recail and use x and - facts up to 12 3		_						
	calculations,	divide	ace value to	5	4	3	2			
	including with	- I can divide HTU by U where there is a rem	nainder.		I					
	and large	Step 2		496 ÷ 11 becomes						
	numbers	- I can recall all ÷ facts related to times table	s up to 12 x 12							
		- I can use place value, known and derived f	acts to divide	4 5 r1	_					
	Divide numbers	mentally, including dividing by 1		1 1 4 9 6						
	up to 4 digits by	- I know multiples, factors and prime number	S	A						
	a two-digit	- I can use brackets in simple calculations	a a a sua luca da	Answer: 45 $\frac{1}{11}$						
	formal written	- I can use knowledge of times tables and pla divide e.g. $480 \div 4 = 120$ so $48 \div 4 = 12$	ace value to	Prog	gressing to	o long di	vision to t	find a de	cimal re	mainder:
	method of long	- I can check whether my answer is likely					2	8 • 8		15
	division	- I divide HTU by TU where the remainder is	recorded as a			1 5	4 3	2 • 0		30
	Interpret fraction. Interpret cremainders as whole number I can divide a two-digit number by 2,3,4,						3 0	1 I		45
							1 3	2		50
			and 10 with				1 2	0 ↓		75
	remainders,	whole number answers and remainders	rown footo to				1	2 0		/3 00
fractions, or by - I ca		maintain fluency.					1	2 0		105
	appropriate for	- I can identify multiples and factors, includin	g finding all					0		120
	the context.	factor pairs of a number, and common factor	ors of two							
		numbers		Simplify this method						
	Divide numbers up to 4 digits by	- I can use brackets and inverses effectively	e.g. (24+P) x 6 =	2 8, 8						
	a two-digit	- I can use rounding to check answers to cal	culations and	15 4 3 132 - 120						
	number using the determine, in the context of a problem, let		els of accuracy							
	formal written	- I can explore the order of operations using	brackets							
	method of short division as appropriate	- I divide HTU by T U where the remainder is	s recorded as a							
		decimal.								
Vocabulary		Vocabulary	I	Ke	v resou	irces				
vocabulary										