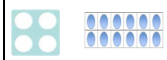
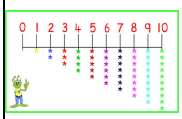
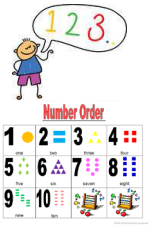
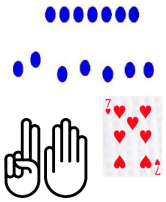
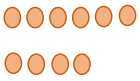
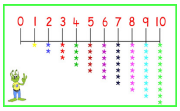
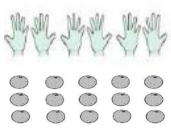
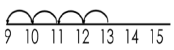
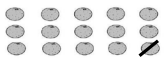
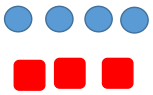
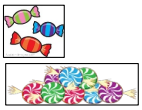
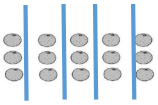
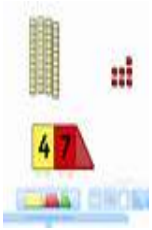
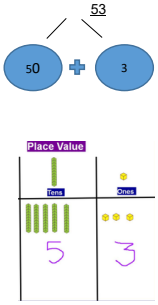
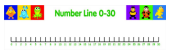
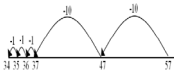
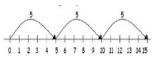
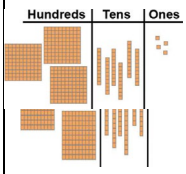
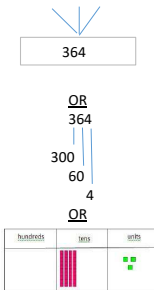
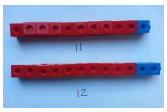
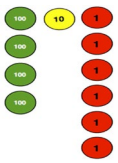
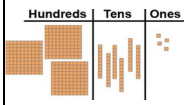
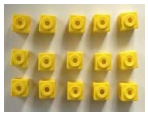
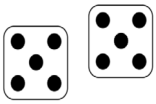
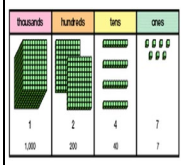
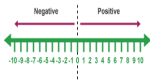
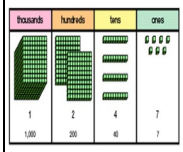
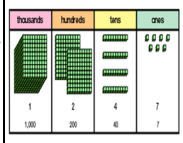
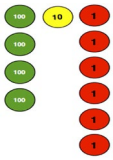
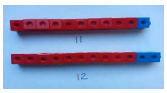
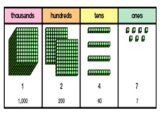
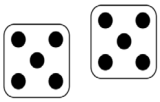
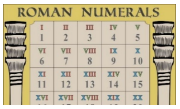
Creative Education Trust

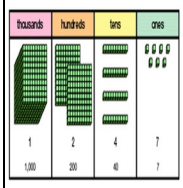
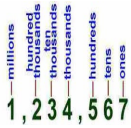
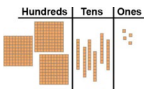
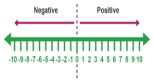
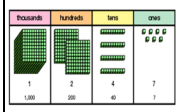
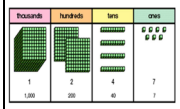
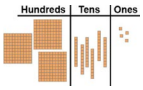
Primary Mathematics Progression Map:
Number and place value (incuding decimals)

Minimum expectations for Year…	NC Outcomes	Specific vocabulary	Concrete	Pictorial	Abstract	Reasoning and problem-solving
Nursery / Reception	count reliably with numbers from 1 to 20, place them in order	numbers, count, order	Singing counting songs using objects to touch count. Touch counting real life objects e.g. fruit or money .Giving children opportunity to count objects all around them. 	Drawing spots to match numbers on a numberline. Counting printed spots on base ten frames or counting Numicon pictures.  	Children can count from 1 to 20 and can place numbers in order 	Identifying ideas that the amount is 'seven' and doesn't change although presented differently. 
	say which number is one more than a given number	one more than, one greater than	Provide children with opportunities to count real life objects /numicon/blocks explicitly using the language of one more. If I had 1 more apple how many would I have? 	Children drawing pictures to find the answer to questions such as:-I have 2 apples and there is one more on the floor. How many apples are altogether? 	Can you circle the picture that has one more than 4 apples? 	Children respond to questions such as :- Billy has 4 apples. Poppy has one more apple than Billy. Sam has one more apple than Poppy. How many apples does Sam have?
	using quantities and objects they add two single digit numbers and count on to find the answer	add, count on, one digit, numbers, answer	Use of real life objects, blocks and numicon. If I have 6 eggs and you have 4 eggs how many eggs do we have altogether? 	Children draw pictures to find the answer to questions such as:- 6 + 4 = 	6 + 4 = 4 + 6 = 6 + ☐10 4 + ☐10	If an egg box holds 10 eggs and I have got 6 of them. How many eggs are in the box?
Year 1 / Year 2	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number	count forwards, count backwards, any number	Children to use hundred squares and number lines. Find 21 and count in 1's forwards from it….. 	Children to draw pictures to help them with the counting process. 	Children can count aloud from 1 to 100 forwards and backwards from any given number.	Tom is counting forwards, is he right? 62, 63, 66, 67, 68, 69, 70 Chidren can solve number problems mentally like:- If Sam had 21 eggs and I had one more how many eggs would I have?
	count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	numbers, numerals, multiples, twos, fives, tens	Children to use hundred squares and number lines. Find 3 and count in 10's forwards from it….. 	Children to draw pictures to help them with the counting process. 5 10 15 20 25 30 	Children can continue sequences of numbers counting forwards and backwards in twos, fives and tens 5, 10,___ ,20, ___ 30 ,35___ Children know that 95 count back 5 = 90 by rapid recall.	Mr White asks his class to count up in 5's. They start at 20. What are the next 3 numbers they count? Chidren can solve number problems mentally like:- If Sam had 15 eggs and I had 10 more how many eggs would I have?
	given a number, identify one more and one less	one more, one less, one greater, one fewer	Children to use concrete material and real life objects. Children to use 100 squares and number lines. 	Children to draw pictures to show what one less than 15 is. 	15 + 1 = 15 - 1 = 67 + 1 = 67 - 1 =	If there are 67 birds in a tree and one flies away how many birds are left? If 67 is the answer what is the question? (66+ 1 = 68 - 1)

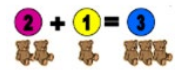
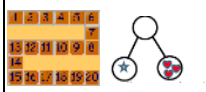
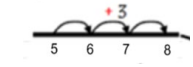
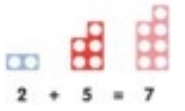
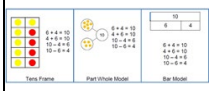
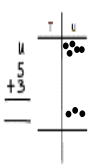
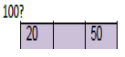
identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least	equal to, more than, less than, fewer, most, least	Children to use concrete material and real life objects. Children to use 100 squares and number lines.	Children use pictures to explore key concepts. Draw one more circle. How many circles are there? 	Circle the picture that has the most. 	Bob is hungry. He has two piles of sweets, which one should he choose? 
read and write numbers from 1 to 20 in numerals and words	read, write, numerals, words	Play matching numbers to numeral games 	Children draw pictures and write numbers and words together to show the value of each number. 	a) two = b) eleven = c) nine =	Charlotte is 6 years old. Can you write her age using a word?
count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	numbers, numerals, multiples, twos, threes, fives, tens, forwards, backwards	Children to use hundred squares and number lines. Find 3 and count in 3's forwards and backwards from it..... 	Children to draw pictures to help them with the counting process. 3 6 9 12 15 	Children can continue sequences of numbers counting forwards and backwards in twos, threes, fives and tens 3, 6,___ ,12, ___ 18 ,21___ Children know that 21 count back 3 = 18 by rapid recall.	Miss Cook starts at 94 and counts back in tens. She thinks that she will land on the number 49. Is she correct?
recognise the place value of each digit in a two-digit number (tens, ones)	place value, digit, ones tens	Children to use diennes apparatus and arrow cards to make two digit numbers in different ways. 	Children to draw pictures to show the value of each digit in a 2 digit number. 	Partition these numbers: 84 = 36 = How many tens in 63? How many ones in 14?	Spot the mistake! 43 = 40 + 2 56 = 60 + 5 21 = 2 + 1
identify, represent and estimate numbers using different representations, including the number line	estimate, represent, numberline	Children to use concrete material and real life objects. Children to use 100 squares and number lines. 	Children can create their own empty numberlines to help them to represent and estimate numbers. 	What number is the arrow pointing to? ↓ ☐	Mrs Harper starts at 26 on the number line and counts on 8. What number does she land on?
compare and order numbers from 0 up to 100; use <, > and = signs	greater than, less than, equals, tens, ones	Children use diennes appartus/blocks/pom poms to make numbers and use crocodile jaws to eat the greatest. 	Children draw pictures to show which numbers are the greatest. 	Put < and > in the right box to make the number sentence correct. 45 71 53 ☐ 23 ☐	Which is the larger number: 89 or 98? Explain how you know? Are these numbers ordered from biggest to smallest correctly? Circle the mistake. 62, 54, 57, 31, 14
read and write numbers to at least 100 in numerals and in words	read, write, numerals, words	Play matching numbers to numeral games 	Children draw pictures and write numbers and words together to show the value of each number. 	Children can read words fifty six, twenty one, seventy four in any order and by rapid recall. Match these numbers to words. Seventy 54 seventeen 70 fifty four 17	Sam has written fourteen in numerals. Is he correct? 41 Explain your answer.

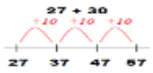
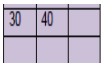
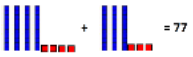
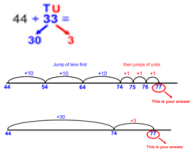
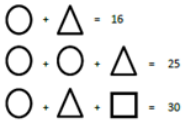
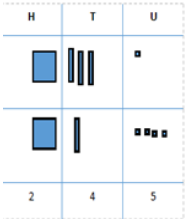
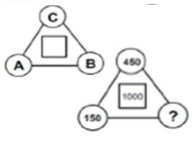
	use place value and number facts to solve problems.	place value, digit, ones tens, problem solving, diennes apparatus, arrow cards	Children to use diennes apparatus and arrow cards to make numbers in different ways. Prove 75 is greater than 57 using concrete material.	Prove 75 is greater than 57 using pictures.	Complete the number sentences. 54 63 72 > ☐	Prove 75 is greater than 57 using concrete material?
Year 3 / Year 4	count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	multiples, more than, less than, number sequences, counting on in fours, eights, fifties, hundreds	Use cubes and counters to recognise patterns for multiples 	Use number lines to count in multiples 	Count from 0 in a multiple of 4, 8 , 50 or 100. Say 10 or 100 more or less than a given number.	Explain how to find 10 and 100 more or less than a given number.
	recognise the place value of each digit in a three-digit number (hundreds, tens, ones)	place value, ones, tens, hundreds, digit	Use Dienes blocks and place value charts. 	After practically using the base 10 blocks and place value counters, draw the Dienes equipment. 300+60+4= 	Recognise the value of a digit by recognising the value of the column.	Explain the value of each digit in a 3 or 4 digit number. 
	compare and order numbers up to 1000	bigger than, less than, greater than….ten, hundred, thousand	Use cubes to make and compare numbers 	Use visual representations to compare numbers	Explain why one number is larger than another number	Prove that a given 3 or 4 digit number is larger or smaller than another 3 or 4 digit number.
	identify, represent and estimate numbers using different representations	estimate, place value, digit	Use place value counters to represent different numbers 	Use pictures of place value number cards 	Estimate the number if items in a group 	Explain how to estimate the number of items in a group.
	read and write numbers up to 1000 in numerals and in words	numerals, digits, ones, tens, hundreds, thousands	Use Dienes blocks and place value charts. 	Write 3 or 4 digit numbers in words 364 (300+60+4)	Write numbers with 3 or 4 digits in words and numerals Three-hundred and sixty-four	Explain how to write a 3 or 4 digit number in words.
	solve number problems and practical problems involving these ideas.	number problems, solve, addition, subtraction, multiplication, division.	Use cubes and counters to investigate number problems 	Use equipment eg dice to investigate numbers 	Investigate 3 digit numbers	Following an investigation, prove that your solution is correct
	count in multiples of 6, 7, 9, 25 and 1000	multiples, number sequencing, counting on in sixes, sevens, nines, twenty-fives, thousands	Use cubes and counters to recognise patterns for multiples 	Use number lines to count multiples	Count from 0 in a multiple of 6,7,9,25 an 1000.	Count on independently from a given number in multiples of 6, 7 ,9 , 25 or 1000

	find 1000 more or less than a given number	one thousand more, one thousand less, greater than	Use Dienes equipment to find a number 1000 more of less than 	Use place value charts to increase and decrease numbers by 1000	Explain how a given number can be increased or decreased by 100	Prove that a given number has been increased or decreased by 1000
	count backwards through zero to include negative numbers	count forwards, count backwards, zero, numbers less than one	Use equipment eg thermometers to count negative numbers	Use number lines to count backwards through zero 	Count backwards through zero	Investigate negative numbers in context eg Charlotte thinks that -5 is cooler than -8. Is she right? 
	recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	Place value, digit, ones, tens, hundreds, thousands	Use Dienes equipment to regognise the value of digits in a 4 digit number 	After practically using the base 10 blocks and place value counters, draw the Dienes equipment.	Recognise the value of a digit by recognising the value of the column.	Explain the value of each digit in a 3 or 4 digit number.
	order and compare numbers beyond 1000	one more / less, ten more / less, hundred less / more, thousand less / more	Use Dienes equipment to compare 4 digit numbers 	Use visual representations to compare numbers	Explan why one number is larger than another number	Prove that a given 4 digit number is larger or smaller than another 4 digit number
	identify, represent and estimate numbers using different representations	estimate, place value, digit	Use place value counters to represent different numbers 	Use pictures of place value number cards 	Estimate the number of items in a group 	Explain how to estimate the number of items in a group.
	round any number to the nearest 10, 100 or 1000	Rounding off to the nearest ten, hundred, thousand	Use cubes to round investigate rounding a number 	Use number lines to round to 100 or 1000	Round any number to the nearest 10, 100 or 1000 and explain your answers	Prove that a given number is rounded to 10, 100 or 1000
	solve number and practical problems that involve all of the above and with increasingly large positive numbers	number problems addition, subtraction, multiplication, division.	Use Dienes equpiment to solve number problems 	Use equipment eg dice to investigate number problems 	Investigate problems that include 3 and 4 digit numbers	Following an investigation, prove that your solution is correct
	read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	Roman numerals, five, ten, twenty, fifity, hundred.	Use clocks to introduce Roman numerals to 12 	Use Roman numeral charts to read and write numbers up to 100 	Read and write Roman numerals up to 100 	Solve problems that involve Roman numeral up to 1000 

Year 5 / Year 6	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	Value, digit, compare, one million, more than, less than, greater than, smaller than, thousandths, hundredths, tenths, ones, tens, hundreds, thousands, tens of thousands, hundreds of thousands, millions	Use Dienes equipment to investigate larger numbers 	Use place value number charts to recognise the value of each digit to order larger numbers with up to 3 decimal places. 	Write in words numbers up to one million eg One hundred and thirty six thousand nine hundred and twelve and thirty three hundredths (136,912.33) Explain the value of each digit. 	Joshua types the number 1,285,322 into his calculator. His friend reads the number as 'one million, two hundred and eighty five, three hundred and twenty two.' Is Joshua's friend correct? Explain your answer.
	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	Forwards, backwards, powers of 10, million, multiples, muliplication.	Use Dienes equipment to begin counting in steps of powers of 10 	Use number lines to count forwards or backwards in steps of powers of 10	Count in steps of powers of 10	Explain how to count forwards or backwards in powers of 10.
	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero	Forwards, backwards, positive, negative, zero, above zero, below zero, more than zero, less than zero.	Use equipment eg thermometers to read, write and count negative numbers	Which number would Harry say if he counted 9 on from -6? 	Continue the sequence below -155, -115, -75, -35	Prove that -17°C is colder than -14°C.
	round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	Rounding to the nearest ten, hundred, thousand, ten thousand, hundred thousand.	Use Dienes equipment to begin to round to the nearest 10, 100, 1000 	Round the following to the nearest 100,000: 652,966	Mrs Jones has saved £10,422.65 in her bank account. How much money has she saved to the nearest £10?	Describe the rules for rounding 33,678 to the nearest hundred.
	read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	Roman numerals, ten, twenty, fifity, hundred, five hundred, thousand. Mili, cent.	Use Roman numeral charts to read and write numbers up to 1000 	Spartacus the gladiator has won LXXX fights. How many fights has he won? 	Write the numbers that these Roman numerals represent: XXXVI = XXIV =	Prove that 2014 is MMXIV in Roman numerals 
	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit	Value, digit, compare, one million, more than, less than, greater than, smaller than, thousandths, hundredths, tenths, ones, tens, hundreds, thousands, tens of thousands, hundreds of thousands, millions	Use Dienes equipment to investigate larger numbers 	Use place value charts to determine the value of each digit 	How many hundredths are there in 345.876?	Would you rather have the value of the digit 8 in £2,843,993 or the value of £2,981,967?
	solve number and practical problems that involve all of the above.	Addition, subtraction, multiplication, division.	Use Dienes equipment to solve number problems 	Use place value charts to solve number problems 	Mrs McGee put 25 rows of chairs out with 15 chairs in each row. Each chair had 2 raffle tickets on it. How many raffle tickets were there in total?	Jessica said "If I had 448 sweets and I ate 16 and then shared the remainder equally between myself and 24 class mates we would each have 18 sweets." Where has she gone wrong?

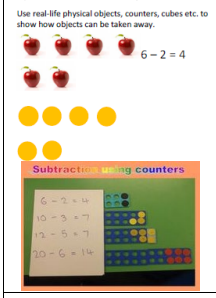
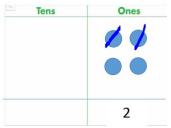
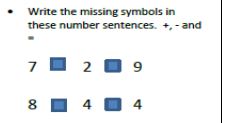
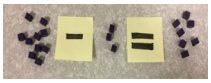
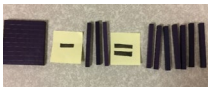
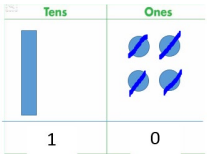
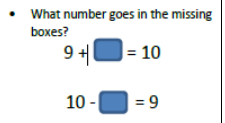
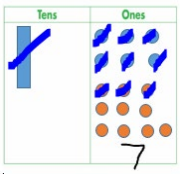
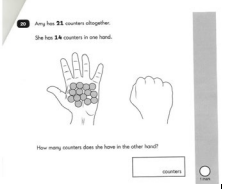
Primary Mathematics Progression Map:
Addition

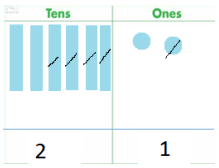
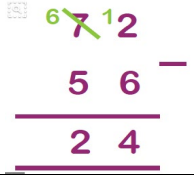
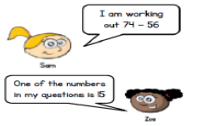
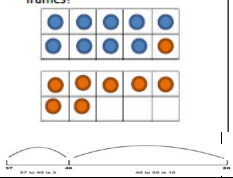
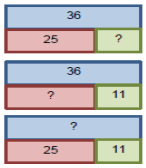
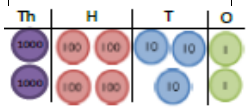
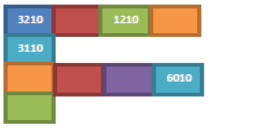
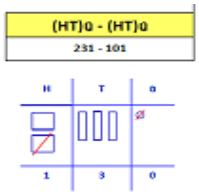
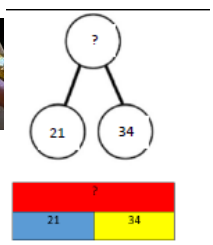
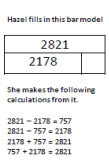
Minimum expectations for Year…	NC Outcomes	Specific vocabulary	Concrete	Pictorial	Abstract	Reasoning and problem solving
Nursery/ Reception	Recognise numbers up to 20 and understand the meaning of each number by recognising and knowing their clusters	add, addition, altogether, sum, make, total, plus, increase, more, and	**Concrete resources**: 100 square Number lines Bead strings Straws Dienes Place value cards Place value dice Place value counters Numicon cubes and any other objects that can be used to count.		Understand what each numerical number represnets e.g 5 = 5 objects, fingers etc.	Adult makes a deliberate error e.g. adult takes 2 dinosaurs and 3 fairies and says I have 4 objects altogether – am I right? Can you suggest a way to count them so I don't make a mistake next time? Is this the only way to count them?
	Count on in ones and say which number is one more than a given number using a number line or number track to 20.				Carry on a number sequence going up in ones 1, 2, 3, __, __, __	Teacher suggests a target total 'I want to have 5 spots altogether on this ladybird'. Invite the children to show different ways of making up the number 5 on two sides of a ladybird template. Have we found all of the ways to make 5 spots?
	Begin to relate addition to combining two groups of objects using practical resources, role play, stories and songs			 	2 + 5 =	Have a 'question of the day' on big sheets of paper for children to answer throughout the day. Schedule a time every day to look at the answers. Can anyone tell me what this means? Do you agree? Why? Would you record it differently? Can you show the class?
	Know that counting on is a strategy for addition. Use numbered number lines to 20				12 + 5 =	
Year 1/Year 2	Represent and use number bonds within 20 (Y1) fluently in Y2, and dervive related facts to to 20.	add, addition, altogether, sum, make, total, plus, increase, more, and, more than, greater than, column, tens, ones, digits, inverse	**Concrete resources**: 100 square Number lines Bead strings Straws Dienes Place value cards Place value dice Place value counters Numicon cubes and any other objects that can be used to count.	Use a variety of pictorial/visual representations to understand number bonds and relationshsips between numbers.	Use whole-part diagrams and other visual methods to move from pictoral to abstract. It is good practise to use the astract representaion alongside the visual and concrete so that children are aware of seeing these along the way. 2 + 3 = 5 3 + 2 = 5 5 = 3 + 2 5 = 2 + 3	Children can deepen their understaning in addition by solving problems and reasoning - they may use concrete, visual and abstract methods to achieve this.
	Add: *one-digit and two-digit numbers to 20, including zero (Y1) *a two-digit number and ones *a two-digit number and tens * two two-digit numbers *adding three one-digit numbers		  2 + 5 = 7 7 + 5 = 12 			• All the dots have fallen off two toad stools. How many different ways can you put them back on? 
	Read, write and interpret mathematical statements involving addition (+) and equals (=) signs (Y1)			Draw different representations of numbers including number lines, dots, tally etc. when doing addition. Visual representations using a numebr frame.	Combine two numebrs that make 10 and then add the remainder 4 + 7 + 6 = 10 + 7 = 17	Kim says ' If I know 9 + 1 = 10, I can work out 90 + _____ = 100' Find the missing number and explain how Kim knows. What numbers go into the missing boxes? 9 + ☐ = 10 10 ☐ = 9
	Show that addition can be done in any order (commutative).		 40 + 8	 IIII + III	Begin to partition and use written methods (expanded column) to add numbers. 42 + 31 = 73	Can you complete the boxes so each row and column adds up to 100? 

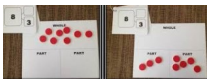
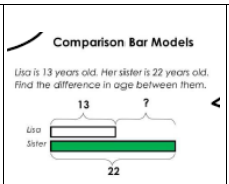
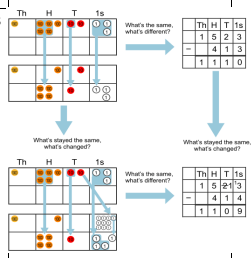
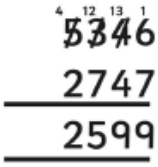
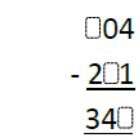
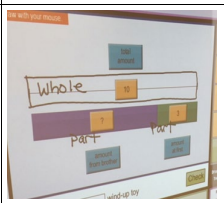
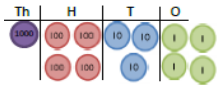
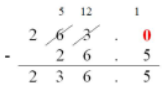
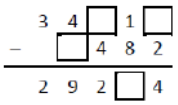
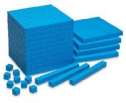
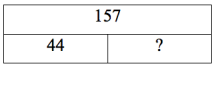
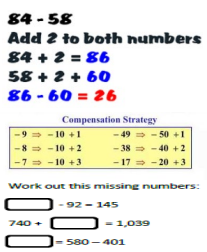
	Recognise and use the inverse relationship between addition and subtraction and use this to check answers and solve missing number problems.			cross out 10 units when it is reached and physically draw an extra ten in the tens column. 	**40 + 2** **30 + 1** **70 + 3**	 Two pieces of ribbon measure 20cm altogether, what is the length of each peice? is there more than one possibility?
	Solve one-step problems that involve addition (Year 2 should include problems that involve other areas of the maths curriculum such as money and measures).		Partition two -digit numebrs using a variety of images and practical equipment 	Tom picks 6 apples and Raj picks 2 apples. How many apples do they have altogether? 	Use variation theory to make connections between numbers 5 = 7 2 + 12 + 5 = 17 12 + 15 = 27 22 + 15 = 37	I have 10p to spend. Which two items could I buy? How many different ways can you do it? 
Year 3/Year 4	Add numbers mentally, including: - a three-digit number and ones - a three digit number and tens - a three-digit number and hundreds	add, addition, altogether, sum, make, total, plus, increase, more, and, more than, greater than, column, ones, tens, hundreds, thousands, digits, inverse, place holder, calculation, operations	Use a variety of concrete materials for counting (deans,arrow cards, place value chips or cards) so that the children can make and combine the numebrs to add. (Same principles as below but with up to 3 and 4 digit numbers) 	Use of number lines, partitioning and place value grids can all be useful for visually representating the addition calculations. 	Extend to using the expanded column method to add three-digit numbers + three-digit numbers ***with carrying*** . **300 + 60 + 7** **100 + 80 + 5** **500 + 50 + 2** **100 10** **40 + 7 47** **30 + 6 +36** **80 + 3 83** **10 1**	Complete the calculation □04 - 2□1 34□ All of the digits below are either a 3 or a 9. Can you work out each digit? 7,338 = ???? + ???? Work out the value of each shape 
	Add numbers with up to three-digits, using formal written methods (column method)(Y3) and up to four-digits (Y4)		**42 + 31 = 73**	131 + 115 =	Links from expanded to compact column method. 300 + 60 + 7 → 367 100 + 80 + 5 → +185 500 + 50 + 2 → 552 100 10 → 11 1 5 2 7 1 + 2 3 5 7 7 6 2 8	
	Estimate the answer to a calculation and use inverse operations to check.				By the end of year 4, pupils should be adding numbers up to 4 digits using compact column addition method. They should have a good understanding of this method and be able tp apply it to any given number of digits in readiness for Y5&6.	John is having a garden party. He will need to make 4,250 sandwiches in total. He makes 1,500 tuna, 750 cheese, 1,350 harr and 920 egg. He decides to make the rest cucumber. How many cucumber sandwiches will there be?
	Solve problems involving missing number problems, using number facts, place value and more complex additin and subtraction (Y3)					These three chicks lay some eggs.  Beth lays twice as many as Kelsey. Caroline lays 4 more than Beth. They lay 44 eggs in total. How many eggs does Caroline lay?
	Solve addition and subtrcation two-step problems in contects, deciding which operations and methods to use and why (Y4)					
Year 5/Year 6	Add and subtract numbers mentally with increasing large numbers.	add, addition, altogether, sum, make, total, plus, increase, more, and, more than, greater than, column, ones, tens, hundreds, thousands, digits, inverse, place holder, calculation, operations	No new concepts and methods are taught in Years 5 and 6, however, use concrete and visual materials outlined throughout the earlier year groups where ever possible to consolodate and refine children's understanding and calulations		Year 5 and 6 should be able to use the compacted column method for addition of numbers with more than four-digits. 1 1 1 4 6 8 9 2 + 3 2 7 5 8 7 9 6 5 0	Abdul says "If I add any two 4 digit numbers together is will make a 5 digit number." Do you agree? Explain why.
	Perform mental calculations, including with mixed operations and larger numbers()Y6)					Three pandas are eating bamboo sticks. There are 51 altogether. They all eat an odd number of sticks. How many bamboo sticks did they each eat? How many different ways can you do it? 
	Use formal method for addition to add numbers with more than four-digits.				The children should also be able to apply this method to add decimal numbers (adding zero as a place holdre where needed)	
	Use rounding and estimation to check calculations and determine, in the contect of a problem, levels of accuracy.				12.5 + 23.7 1 12.5 + 23.7 36.2 34.5 + 27.43 1 34.50 + 27.43 61.93	The number in the square in the middle is calculated using the following rule A + B – C Work out the value of the question mark. 

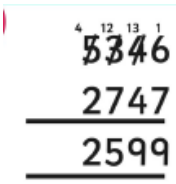
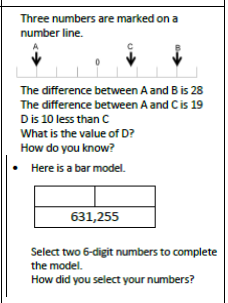
Primary Mathematics Progression Map:

Subtraction

Minimum expectations for Year…	NC Outcomes	Specific vocabulary	Concrete	Pictorial	Abstract	Reasoning and problem-solving
Nursery/ Reception	Using quantities and objects, add and subtract two single-digit numbers and count on or back to find the answer.	Subtract, equals.	100 square Bead strings Straws Dienes Numicon objects for counting 	Cross out drawn objects to show what has been taken away.  5 – 2 = 3	5 - 2 = 3 8 - 2 = 6	Play games which relate to number order, addition and subtraction, such as hopscotch and skittles and target.
Year 1/ Year 2	**read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs**	Subtract, equals, How many more to make..?, How many fewer is…than..?, how much less is..?	100 square Bead strings Dienes Place value cards Place value dice Place value counters Numicon Objects that can be used to count. 	Pictoral representations to support understanding: 4 - 2 = 2 	4 - 2 = 2 5 - 2 = 3	Complete missing number sentences such as: 10 - ? = 6 What is the value of ? _____ 
	represent and use number bonds and related subtraction facts within 20 **add and subtract one-digit and two-digit numbers to 20, including zero** **Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100**	missing number, tens, ones, subtraction, subtract, take away , Difference between How many more to make..?, How many fewer is…than..?, how much less is..?	  	Use drawn representations to support understanding: 14 - 4 = 10 	14- 4 = 10 10 - 3 = 7 100 - 30 = 70	
	Solve problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7= _ -9 (Y1) **Including those involving numbers, quantities and measures,** **Applying their increasing knowledge of mental and**	missing number, tens, ones, subtraction, subtract, take away , Difference between Measures vocabulary	Children to use diennes apparatus and place value charts to support subtraction. Children also use concrete materials such as scales and measuring jugs when working with measures. 	Using Visual Maths to support understanding: 	16 - 9 = 7 7= _ - 9	Two numbers have a difference of 6. The larger number is less than 10. What could the two numbers be? 

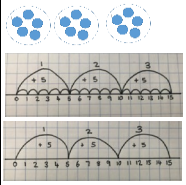
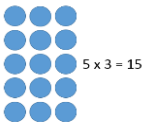
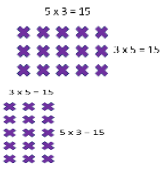
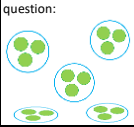
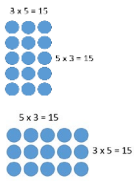
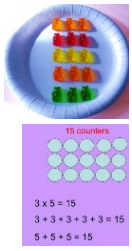
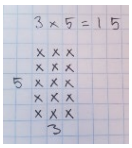
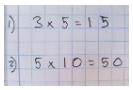
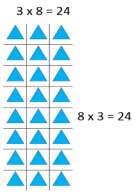
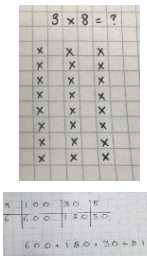
	Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two digit number and ones; a two digit number and tens; two two digit numbers; adding three one digit numbers.	missing number, tens, ones, subtraction, subtract, take away , Difference between	I have 16 cubes, can you take away 8 cubes? Practical resources - subtracting objects. 	Using Visual Maths to support understanding: 62 - 41 = 	62 - 41= 21 72 - 56 = 24 using column method: 	• There are 32 children in Class 2. 17 are girls. How many are boys? • Sam and Zoe are working out some subtractions.  Sam's answer is double Zoe's answer. What could Zoe's question be?
	Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	missing number, tens, ones, subtraction, subtract, inverse, calculation	Use concrete objects such as ten frames and diennes to support understanding of the inverse. 	• How many number sentences can you write to describe the ten frames? 	36 - 25 = 11 11+ 25 = 36	• Write a number sentence to find the value of the ? in each of the bar models.  What do you notice?
	Pupils should be taught to: Add and subtract numbers mentally including: - a three-digit number and ones -a three-digit number and tens - a three-digit number and hundreds Find 1000 more or less than a given number.	Columns, Hundreds, Tens, Ones (Units), missing number, tens, ones, subtraction, subtract, take away , Difference between	Us ter un methods.	Drawn place value counters in columns to aid understanding. 	Notes and jotting to support discovery of patterns and support use of place value knowledge to subtract mentally. 856 – 8 = 856 – 80 = 856 – 800 =	Fill in the boxes by finding the patterns. 
	Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	Columns, Hundreds, Tens, Ones (Units), columnar, subtraction, subtract	Diennes placed into columns to embed understanding of the importance of place value when exchanging during written methods. 	The decomposition method is only introduced once children have sufficient mental methods and understand the principles of the method. Children should know that units line up under units, tens under tens, and so on. 	H T O 2 3 1 - 1 0 1 1 3 0 	• Dan saved £342 in his bank account. He spent £282. Does the subtraction below show how much he has left? Explain your answer. 282 -342 140
Year 3/ Year 4	**Estimate the answer to a calculation and use the inverse to check answers**	subtract, equals, inverse Columns, Hundreds, Tens, Ones (Units), missing number, tens, ones, subtraction, take away , Difference between	Use concrete objects such as diennes to support understanding of the inverse. 	Bar modeling and other pictoral methods to represent calculations. Use to show comunitative law. 	136 - 125 = 11 11+ 125 = 136	• Leonie says, '353 - 26 = 333 because 300 – 0 = 300, 50 – 20= 30, 6 – 3= 3 so 353-26 = 333' Do you agree with her answer? Prove your answer by using an addition calculation. 

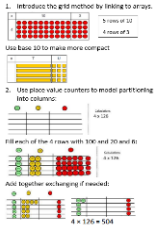
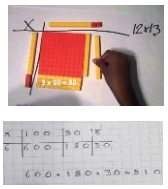
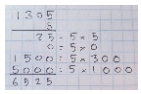
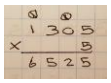
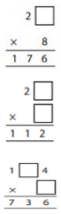
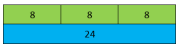
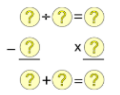
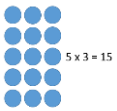
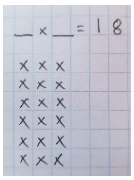
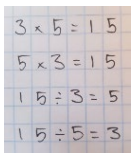
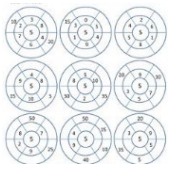
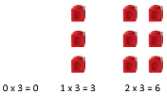
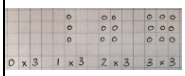
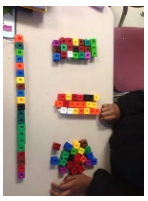
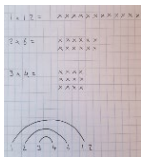
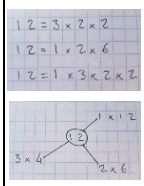
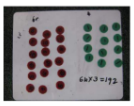
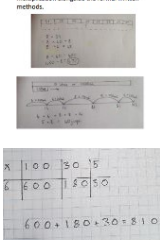
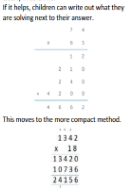
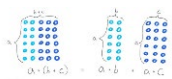
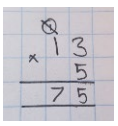
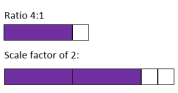
	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	missing number, subtraction, subtract, take away , Difference between	Use concrete objects to demonstrate principle and buuild towards abstract understadning. 		Variations of this concept. 329 - ___ = 247	
	Add and subtract numbers with up to four digits using the formal written methods of columnar addition and subtraction where appropriate	subtraction, inverse Columns, Hundreds, Tens, Ones (Units),	Place value counters in columns to demonstrate princples used during abstract method.			• Complete the calculation 
	Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why	two-step, subtraction, inverse Columns, Hundreds, Tens, Ones (Units), missing number, tens, ones, subtraction, subtract, take away , Difference between	Real objects used to give problems context. 		1284 - 857= 9427 9427 + 589= 10016 Formal column methods used to calculate.	A supermarket has 1284 loaves of bread at the start of the day. During the day, 857 loaves are sold and a further 589 loaves are delivered. How many loaves of bread are there at the end of the day?
	Add and subtract whole numbers with more than four digits, including using formal written methods (columnar addition and subtraction)	Efficient written method subtraction, inverse Columns, Hundreds, Tens, Ones (Units), missing number, tens, ones, subtraction, subtract, take away , Difference between	Place value counters in columns to demonstrate princples used during abstract method.	Calculate 1,434 + 2,517 using place value counters. The first number has been partitioned for you. 	This will lead to an understanding of subtracting any number including decimals. 	
Year 5/Year 6	**Add and subtract numbers mentally with increasingly large numbers**	Order of operations subtraction, inverse Columns, Hundreds, Tens, Ones (Units), missing number, tens, ones, subtraction, subtract, take away , Difference between	Use concrete objects such as diennes to support understanding of mental methods. 	Bar modeling 	Mental strategies with jottings to support subtraction mentally. 	Kangchenjunga is the third highest mountain in the world at 28,169 feet above sea level. Lhotse is the fourth highest at 27,960 feet above sea level. Find the difference in heights mentally. • Choose whether to solve these questions mentally or using written methods. 54 + 46 540 + 460 34 + 69 + 26 298 + 342 566 + 931 999 + 999 1547 + 2742 1999 + 364

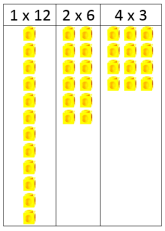
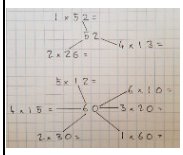
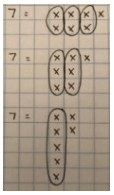
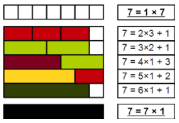
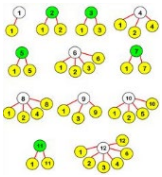
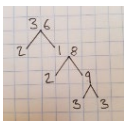
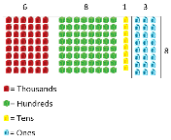
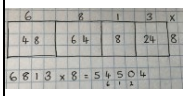
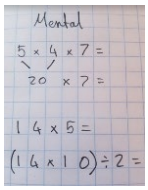
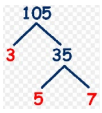
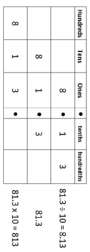
	Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.	Order of operations subtraction, inverse Columns, Hundreds, Tens, Ones (Units), missing number, tens, ones, subtraction, subtract, take away , Difference between	Use concrete objects such as diennes to support understanding of the inverse. 		Round numbers before subtracting to explore reasonablness of answers.	Rachel has £10.She spends £6.49 at the shop. Would you use columnar subtraction to work out the answer? Explain why. True or false? 4999 - 1999 = 5000 - 2000
	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	Order of operations subtraction, inverse Columns, Hundreds, Tens, Ones (Units), missing number, tens, ones, subtraction, subtract, take away , Difference between	Maths lessons in context to enable visualisation of the problems posed. Use concrete objects to support understanding of calculationsto be carried out.	Bar modeling to justify operation used and calculations carried out		

Creative Education Trust

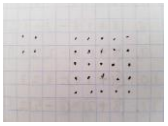
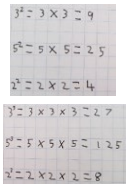
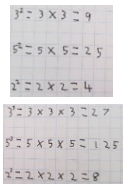
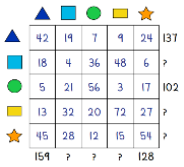
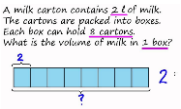
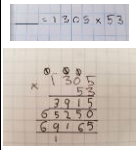
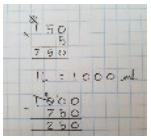
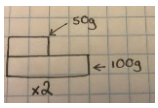
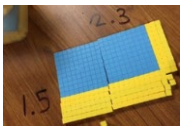
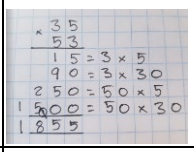
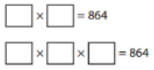
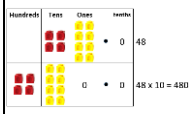
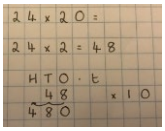
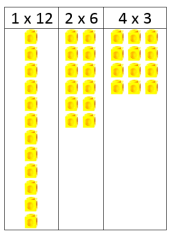
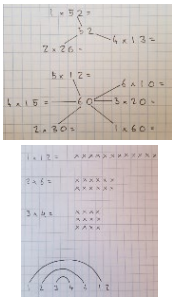
Primary Mathematics Progression Map:
Multiplication

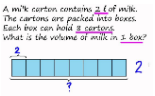
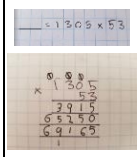
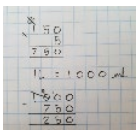
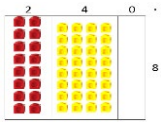
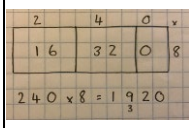
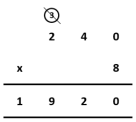
Minimum expectations for Year…	NC Outcomes	Specific vocabulary	Concrete	Pictorial	Abstract	Reasoning and problem-solving
Nursery/ Reception	Doubling	Double, doubling, twice as much, multiply, times, equals.	**Multilink / counters / cubes:** 	**Drawings:** 	**Abstract:** 5 x 2 = 10 5 + 5 = 10	If one teddy has 5 apples, how many apples do 2 teddies have?
Multiplication fluency of facts are learned logically: Practised daily through songs, counting stick etc. Stop at each stage to compare patterns and relationships. Year 1: x1, x2 x1, x10 x5, x10 x1, x10, x11 x2, x4 repeat Year 2: x2, x4, x8 x3, x6 x3, x6, x12 x3, x6, x9, x12 x2 + x5 = x7 repeat	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	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, partition, repeated addition, commutative, sets of, equal groups, as big as, once, twice, three times.	Use different objects to add equal groups: There are 5 sweets in a packet. How many sweets in 3 packets? 	Draw representations. Use of a number line. 	Addition sentences to describe objects and pictures.  5 + 5 + 5 = 15	Ali buys 3 bags of apples. Each bag has 4 apples in it. How many apples does Ali buy?
	Recall and use multiplication and division facts for multiplication tables including recognising odd and even numbers	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, as big as, once, twice, three times.	Arrays using counters: 3 x 5 = 15  5 x 3 = 15	Draw arrays in different rotations: 	Use an array to write multiplication sentences and to reinforce repeated addition: 	Missing numbers: What number could go in the box? 5 x ☐ = 15
Year 1/Year 2	Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs.	Groups of, lots of, times, altogether, multiply, count, all together, multiplied by, repeated addition, sets of, equal groups, times.	There are 5 cakes with with 3 chocolate eggs on each. How many chocolate eggs are there altogether? 	Drawings to represent the question: 	**Abstract:** 5 x 3 = 15 3 x 5 = 15	**Prove it:** Which four number sentences link these numbers? 3, 5, 15? Prove it.
	Show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot.	Array, commutative, multiply, multiplication, times, multiple, times, groups of, lots of, columns, rows, repeated addition, sets of, equal groups, times.	**Arrays using counters/cubes:** 	**Draw arrays:** 	**Abstract:** 5 x 3 = 15 3 x 5 = 15	**Making links:** Write the multiplication number sentences to describe this array X X X X X X What do you notice? Write the division sentences.
	Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	Array, commutative, multiply, multiplication, times, multiple, times, groups of, lots of, columns, rows, repeated addition, sets of, equal groups, times.	Use of real objects in context of problem to be solved to form into arrays. Move on to use of counters. 	Drawn arrays and groups of counters to answer multiplication problems. 	Quick recall of multiplication facts to answer problems involving multiplication. 	**Prove it:** 3 x 5 = 15 Prove that this number sentence is correct using objects and drawings.
Multiplication fluency of facts: Practised daily. Stop at each stage to compare patterns and relationships. Pace increases. Consolidation of fluency increased and therefore more time spent deepening understanding.	Recall and use multiplication and division facts for multiplication tables.	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, as big as, once, twice, three times, multiple, product, tens, ones, value	**Arrays using objects:** 	**Arrays using drawings:** 	**Abstract:** 3 x 8 = 24 8 x 3 = 24	**Making links:** Cards come in packs of 3. How many packs do I need to buy to get 24 cards?

Year 3/4: x1, x2 x1, x10 x5, x10 x1, x10, x11 x2, x4 x2, x4, x8 x3, x6 x3, x6, x12 x3, x6, x9, x12 x2 + x5 = x7 repeat	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	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, as big as, once, twice, three times, partition, grid method, multiple, product, tens, ones, sets of, inverse		**Grid method to bridge between contrete and abstract:** 136 x 5 = ?  	**Formal written method (expanded and then compact):**  	**Missing digits:** 
	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	Array, multiply, count, all together, repeated addition, multiplied by, column, row, commutative, sets of, equal groups, times, as big as, partition, grid method, multiple, product, tens, ones, sets of, scale, ratio, proportion	**Cuisenaire rods or cubes to represent the problem:** E.g. 3 x __ = 24 	**Pictures using the bar model or array:** 	**Abstract:** 3 x __ = 24	Can you put the numbers 1 to 8 into the circles so that the four calculations are correct?  http://nrich.maths.org/2005
	Recall multiplication and division facts for multiplication tables up to 12 × 12	times, multiply, multiplied by, multiples, factors, product, lots of, groups of, sets of, commutative, tens, ones, inverse, count, altogether, repeated addition, array, column, row, equal groups, as big as, once, twice, three times.	Use arrays with counters to support understanding and build fluency: 3 x 5 = 15  5 x 3 = 15	Pictoral arrays to support understanding and build fluency: 	Quick recal of multiplicaition facts written and orally: 	Quick recall of multiplication facts in different contexts and inverse: 
Year 3/Year 4	Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, as big as, once, twice, three times, partition, grid method, multiple, product, tens, ones, zero, sets of, inverse	**Use cubes or counters to make arrays to represent the multiplication:**  0 x 3 = 0 1 x 3 = 3 2 x 3 = 6	**Drawings of arrays:** 	**Abstract:** 0 x 3 = 0 1 x 3 = 3 2 x 3 = 6 6 ÷ 3 = 2 3 ÷ 3 = 1 0 ÷ 3 = 0	**Use a fact:** 63 ÷ 9 = 7 Use this fact to help you work out: 126 ÷ 9 = 126 ÷ 7 =
	Recognise and use factor pairs and commutativity in mental calculations	Array, multiply, multiplied by, column, row, commutative, factor, factor pairs, multiples.	rearranging the same amount of coun ters/ objects in different groups to prove factors and make links to abstract understanding: 	Arrays in different orientations: 	Use knowledge of factors to perform mental calculations with some jottings: 	How can you use factor pairs to solve this calculation? 13 x 15 = (EG: 13 x 3 x 5)
	Multiply two-digit and three-digit numbers by a one-digit number using formal written layout	multiplied by, repeated addition, column, row, equal groups, times, as big as, once, twice, three times (etc), partition, grid method, multiple, product, tens, ones, commutative, array.	Children can continue to be supported by place value counters at the stage of multiplication.  It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. 	Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer.  This moves to the more compact method. 	**How close can you get?** __ __ __ x 7 Using the digits 3, 4 and 6 in the calculation above, how close can you get to 4500? What is the largest product? What is the smallest product?
	Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects	Groups of, lots of, times, multiply, all together, multiplied by, commutative, distributive, scale, ratio, proportion.	Base 10 to explore and prove the distributive law to multiply: 34 x 6 =  30 x 6 + 4x6 =180+24 =204	Draw arrays to explore the distributive law and apply know multiplication facts to do this mentally: 	Grid method then formal written multiplication to solve word problems: 	Tim buys a packet of sweets for 5p. Jen buys 13 more packets. How much did she spend?
	Scaling	Scale, ratio, proportion, multiply, multiples, groups of, lots of, commutative, distributive, factors.	**Cuisenaire rods or cubes:**  Ratio 4:1 Scale factor of 2:	**Scale factor of 2:**  3 : 1 6 2	**Abstract:** 4:1 x 2 = 8:2	The ratio of flour to milk is: 4 : 1 To make pancakes for a group of people, 3 times the amount of milk is required. How much flour is needed?

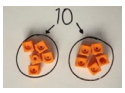
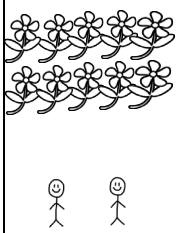
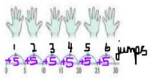
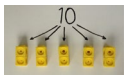
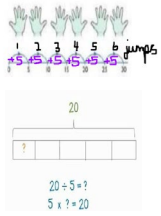
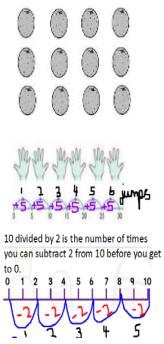
	Identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, commutative, equal times, once, twice, three times, partition, multiple, product, tens, ones, sets of, inverse, square, factor, integer.	Reordering counters in order to establish factors and common factors: 	Spider diagrams to show factor pairs and identify common factors: 	Writing multiples to find common multiples. Move on to using number facts to identify common factors and multiples: 	**Always, sometimes, never?** Is it always, sometimes or never true that prime numbers are odd?
	Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers	Prime, composite, integer, multiple, factors, multiply, multiplied by, distributive, commutative	Use counters or cubes to demonstrate that prime numbers cannot be divided into any other group but 1 and itself: 6 ÷ 2 = 3  6 ÷ 3 = 2  7 cannot be divided evenly: 	Divide the number into different groups to find whether it is prime or composite: 	**Prime numbers:** 2, 3, 5, 7, 11 etc. **Composite numbers:** 4, 6, 8, 9, 10 etc.	**Always, sometimes, never?** Is it always, sometimes or never true that prime numbers are odd.
	Establish whether a number up to 100 is prime and recall prime numbers up to 19	Prime, composite, integer, multiple, factors, multiply, multiplied by, distributive, commutative	Use of Numicon / cuisenaire rods / counters / cubes to prove numbers can't have any factors and must be prime: 	Drawn spider diagrams to establish whether a nuumber is prime or not: 	Use of multiplication facts to estabilish prime numbers and prove that numbers are not prime: 	Circle the prime numbers on a 100 square. Use a chosen method to identiify them.
	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	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, grid method, multiple, product, hundreds of thousands, tens of thousands, thousands, hundreds, tens, ones, sets of, inverse, integer, digit	**Base 10 / counters / cubes:** It is important that the children always multiply the ones first and note down their answer, followed by the tens, hundreds and thousands. 	**Array:** It is important that the children always multiply the ones first and note down their answer, followed by the tens, hundreds and thousands. 	**Abstract:** 	**Prove it:** What goes in the missing box? 12 2 ÷ 12 = 157 3☐5 ÷ 18 = 212.5 3☐2 ÷ 8 = 421.5 3☐ .7 = 178.6 Prov ☐
	Multiply and divide numbers mentally, drawing upon known facts.	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, grid method, multiple, product, hundreds, tens, ones, sets of, inverse, divide, divided, divisor, dividend, integer, digit.	**Use counters / cubes to complete the problem:** 	**Mental calculations with jotting to explain method:** 	Distributive law to multiply 2 by 2 digit multiplication calculations: 	Carry out these calculations mentally to estabilsh which is the odd one out: 134 + 216 = 1400 ÷ 4 = 5 × 70 = 70% of 500 = 965 – 715 =
	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000	Multiply, multiplied by, column, commutative, associative, distributive, times, as big as, once, twice, three times, partition, multiple, product, hundreds, tens, ones, tenths, hundredths, thousandths, inverse, divide, divide by.	**Counters / cubes / Base 10 on a place value chart:** 	**Draw a place value chart:** 	**Abstract:** 81.3 x 10 = 813 81.3 x 100 = 8130 81.3 x 1000 = 81 300 81.3 ÷ 10 = 8.13 81.3 ÷ 100 = 0.813 81.3 ÷ 1000 = 0.0813	**Making Links:** 7 x 8 = 56 How can you use this fact to solve these calculations? 0.7 x 0.8 = 5.6 ÷ 8 =

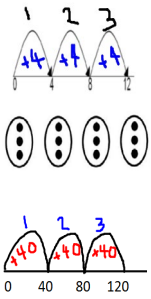
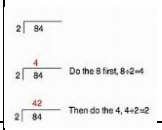
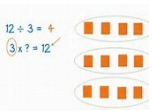
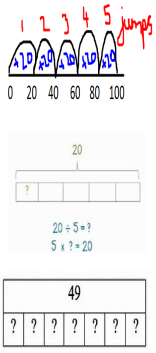
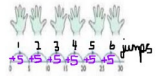
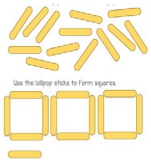
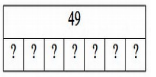
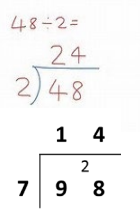
Year 5/Year 6

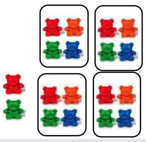
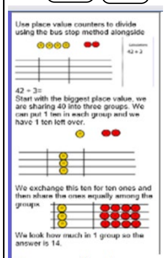
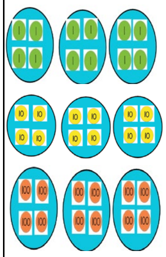
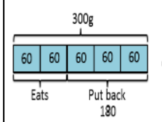
Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	Array, multiply, multiplied by, commutative, equal times, multiple, product, sets of, inverse, square, factor, integer, cubed, squared.	Form counters into squares to establish and prove square numbers. Build cubed numbers using multilink to prove cubed numbers. 	Draw squared numbers and link to written calculation. Apply squared notation (^{2}). 	Use of squared and cubed notification and linked to multiplication. 	Sorting numbers on a Venn diagram.
Solve problems involving multiplication and division, including using their knowledge of factors and multiples, squares and cubes	Array, multiply, multiplied by, commutative, equal times, multiple, product, sets of, inverse, square, factor, integer, cubed, squared.	Form counters into squares to establish and prove square numbers. Build cubed numbers using multilink to prove cubed numbers. 	Draw squared numbers and link to written calculation. Apply squared notation (^{2}). 	Use of squared and cubed notification and linked to multiplication. 	 Which numbers are squared numbers? How many multiples of 6 can you find? How many prime numbers can you find - how do you know they are prime?
Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, grid method, multiple, product, hundreds, tens, ones, sets of, inverse, divide, divided, divisor, dividend, integer, digit.	**Investigating problems in context:** EG: applying to measures  **Ingredients** 60g brown sugar 300g self raising flour 2 teaspoons ginger 1 egg 125g butter 90g golden syrup Currants, cherries and orange peel	**Bar model to represent problems pictorally:**  A milk carton contains 2 l of milk. The cartons are packed into boxes. Each box can hold 8 cartons. What is the volume of milk in 1 box?	Calculations in different contexts with some 	A bottle holds 1 litre of lemonade. Rachel fills 5 glasses with lemonade. She puts 150 millilitres in each glass. How much lemonade is left in the bottle? 
Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	Scale, ratio, proportion, multiply, multiples, groups of, lots of, commutative, distributive, factors.	**Cuisenaire rods / cubes / counters to show the ratio:**  	**Bar model to represent problem pictorally:**  	100g of butter is 2 x 50g butter, so the recipe needs to be doubled - 180g flour, 120g seeds, 60ml water.	Here is a recipe for biscuits: 90g flour 50g butter 60g seeds 30ml water Nigel has 100g of butter to make more biscuits. How much flour, seeds and water will be needed? Explain what you needed to do to get the answer and why.
Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.	Array, multiply, multiplied by, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, multiple, product, hundreds of thousands, tens of thousands, thousands, hundreds, tens, ones, tenths, hundredths, integer, digit	**Introduce concept of multiplying decimal numbers using Base 10:**  	**Use of expanded column method to build understanding of formal written method:** 	**Compact formal written method for multiplication:** 	**Missing numbers:** 
Perform mental calculations, including with mixed operations and large numbers.	Place value, multiply, multiplied by, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, multiple, product, decimal, integer, digit	**Counters / cubes / Base 10 to represent the problem:**  	**Pictorial:** 	**Abstract:** 24 x 20 = 480	**Word problem:** A crate holds 24 oranges. How many oranges are there in 20 creates?
Identify common factors, common multiples and prime numbers.	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, commutative, equal times, once, twice, three times, partition, multiple, product, tens, ones, sets of, inverse, square, factor, integer.	Reordering counters in order to establish factors and common factors:  	Spider diagrams to show factor pairs and identify common factors 	Writing multiples to find common multiples. Move on to using number facts to identify common factors and multiples 	Write down all the common multiples of 20 and 30 which are between 90 and 150.

	Use their knowledge of the order of operations to carry out calculations involving the 4 operations	Multiply, multiplied by, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, multiple, product, decimal, integer, digit, inverse, square, factor, cubed, squared, operation.	Use manipulatives, such as counters, to create the problem - working through BODMAS. 	Write down what BODMAS means: **B** - brackets **O** - order **D** - division **M** - multiplication **A** - addition **S** - subtraction		**Which is correct?** Which of these number sentences is correct? 3 + 6 x 2 = 15 6 x 5 - 7 x 4 = 92 8 x 20 ÷ 4 x 3 = 37
	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	Groups of, lots of, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, grid method, multiple, product, hundreds, tens, ones, sets of, inverse, divide, divided, divisor, dividend, integer, digit.	Investigating problems in context. EG: applying to measures 	Bar modeling to represent problems pictorally 	Calculations in different contexts with some 	A bottle holds 1 litre of lemonade. Rachel fills 5 glasses with lemonade. She puts 150 millilitres in each glass. How much lemonade is left in the bottle? 
	Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Estimate, times, array, altogether, multiply, count, all together, multiplied by, repeated addition, column, row, commutative, associative, distributive, sets of, equal groups, times, as big as, once, twice, three times, partition, grid method, multiple, product, hundreds, tens, ones, sets of, inverse, integer, digit.	**Use arrays / cubes / counters:** 243 x 8 = ? 240 x 8 = ? It is important that the children always multiply the ones first and note down their answer, followed by the tens and hundreds. 	**Pictorial using an array:** It is important that the children always multiply the ones first and note down their answer, followed by the tens and hundreds. 	**Abstract:** 240 x 8 = 1920 	**Use the inverse:** Use the inverse to check if the following calculations are correct: 467 ÷ 12 = 37 27.74 ÷ 19 = 1.46 **Size of an answer:** The product of a single digit number and a number with two decimal places is 21.34 What could the numbers be?

Primary Mathematics Progression Map: Division

Minimum expectations for Year…	NC Outcomes	Specific vocabulary	Concrete	Pictorial	Abstract	Reasoning and problem-solving
Nursery/ Reception	Solve problems, including halving and sharing. Use concrete and pictorial representations to halve numbers to 10.	divide, share, halve	Use concrete resources e.g. Numicon to halve numbers to 10. Share quantities using practical resources, role play, stories and songs. 	Use pictorial representations to halve numbers to 10. 	4 ÷ 2 = 2	Sharing equipment (eg lego) between two "Let's divide it between the two of you"
Year 1/Year 2 Division fluency of facts should be taught as the inverse of multiplication: Practised daily. Stop at each stage to compare patterns and relationships. discuss application of inverse. Year 1: **x1, x2** **x1, x10** **x5, x10** **x1, x10**, x11 **x2**, x4 repeat Year 2: **x2**, x4, x8 x3, x6 x3, x6, x12 x3, x6, x9, x12 **x2 + x5** = x7 repeat **Those that are in bold are the NC expectations for KS1 children.**	**Solve one step problems involving multipliation and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.**	Divide, halve, sharing, grouping	I have 10 cubes, can you share them equally in 2 groups? Practical resources - sharing objects. 	Share the 10 flowers between the 2 children. 	10 ÷ 2 = 5	There are 10 children in the school hall. How many groups of 2 children can their teacher make?
	Recall and use division facts for multiplication tables.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse	Link with times tables facts. 	30 ÷ 5 = 6 Link with times tables facts. 	Calculate: 4 x 5 = 20 ÷ 5 = 6 x 10 = 25 ÷ 5 =	Sally and Katie want to share sweets out equally between them. They can buy bags of 17, 18 or 21 sweets. Which bag should they buy? Which has more? 4 bags of sweets with 5 in each or 3 bags of sweets with 10 in each? Explain your reasoning.
	Calculate mathematical statements for division within multiplication tables they know and write them using the division and equals signs.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divide, divided by, divided into, arrays	Dividing quantities into equal groups. 	Use a number line to show jumps in groups.The number of jumps equals the number of groups. Bar modelling. 	5 x 3 = Write a division sentence using the same numbers.	Ted buys 4 books for £2 each. If he has a £10 note, how much change will he get? Write the multiplication sentence you need to do. Which four number sentences link these numbers 2, 4, 8? Prove it.
	Solve problems involving division, using materials, arrays, repeated subtraction, mental methods, and multiplication and division facts including problems in context.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divide, divided by, divided into, arrays	12 stars shared between 3 children. 	Use pictures, numberlines, bar models. 	12 ÷ 3 = 4 4 x 3 = 12 12 ÷ 4 = 3 3 x 4 = 12	Cassie has 3 bags with 4 sweets in each, Rachel has 4 bags with 3 sweets in each. How many do they have each? True or False? 2 x 5 = 5 x 2 2 x 5 = 10 x 1 2 x 5 = 1 x 10 What do you notice?

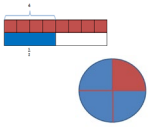
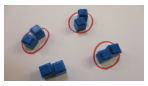
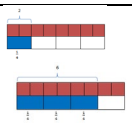
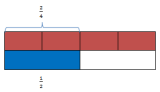
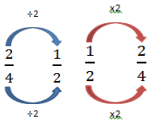
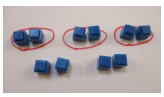
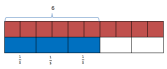
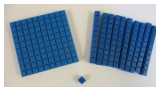
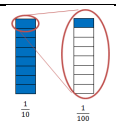
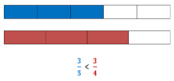
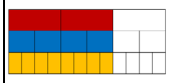
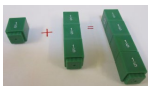
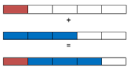
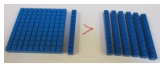
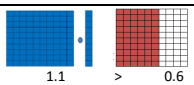
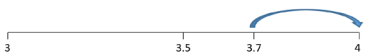
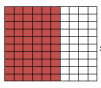
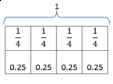
Division fluency of facts should be taught as the inverse of multiplication: Practised daily. Stop at each stage to compare patterns and relationships. Pace increases. Deepen understanding of inverse when applying to divsion. Year 3/4: x1, x2 x1, x10 x5, x10 x1, x10, x11 x2, x4 x2, x4, x8 x3, x6 x3, x6, x12 x3, x6, x9, x12 x2 + x5 = x7 repeat	Recall and use multiplication and division facts for multiplication tables.	Divide, division, divided by, divided into, inverse	Real life arrays 	Links with times tables facts - inverse. 	Answer these calculations: 8 x 4 = 6 x 3 = 9 x 4 = Is this correct? Prove it!	Becky has 32 sweets. She shares them between 4 friends. How many sweets does each friend get? 8 x 8 = 64
	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.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divided by, divided into, arrays, inverse	Objects / place value counters. An example might be: 12÷ 3 = 4 	12 ÷ 4 = 3, 120 ÷ 40 = 3 	Answer these calculations: a) 12 x 3 = 36 ÷ 3 = b) 8 x 4 = 32 ÷ 4 = c) 11 x 8 = 88 ÷ 8 =11 **Introduce** formal layout of bus stop method. 	A box of chocolates has 12 chocolates on each layer. There are 4 layers in the box. How many chocolates are there altogether? 12 teams can be made out of 48 people. How do you know? Explain your answer.
Year 3/Year 4	Solve problems, including missing number problems, involving multiplication and division, includng positive inger scaling problems and correspondence problems in which n objects are converted to m objects.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divided by, divided into, arrays, inverse	Use concrete resources to solve the problems. 	Number lines and bar models. 	a) 23 x 6 = 138 138 ÷ ? = 23 b) 13 x 3 = 39 39 ÷ 3 = ?	Katie's grandparents give her £36 on each birthday. How much money would she have after 8 years? Check your answer with the inverse. Miss Harper had 12 pairs of shoes. During the next year, she got 4 times as many shoes. Callum said she now has 36 pairs, is he correct? Explain your answer. Show the inverse.
	Recall multiplication and division facts for multiplication tables up to 12 × 12.	times tables, multipication facts, division facts, inverse			a) 6 x 6 = b) 48 ÷ 6 = c) 9 x 3 =	How many days are there in 8 weeks? Explain how you know that 12 x 20 is 240.
	Non- Statutory - To become fluent in the formal written method of short division with exact answers.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divided by, divided into, arrays, inverse	Continue to use concrete resources. Use multiplication and division facts to find remainders. 13 ÷ 4 = 3 r 1 	Continue to use diagrams, pictures and bar models. 	No remainders in answer or carried.Then no remainders in final answer but remainders within the calculation. 	144 pupils are going on a school trip. One adult is needed for every 9 pupils. How many adults are needed?

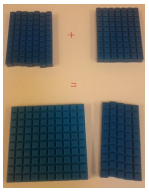
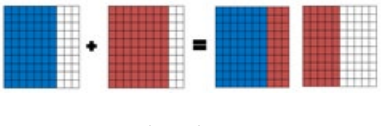
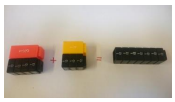
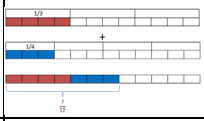
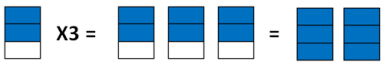
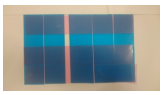
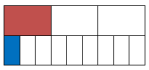
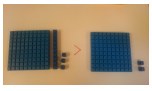
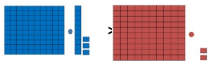
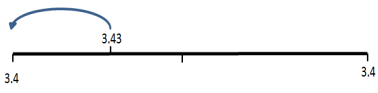
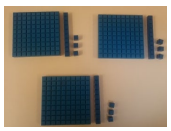
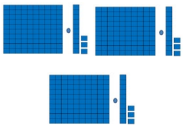
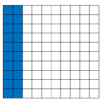
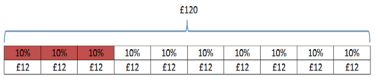
Year 5/Year 6	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divided by, divided into, arrays, inverse, short division, divisible, remainder, whole number, fraction remainder, decimal remainder, factor	Use practical resources, counters or diennes.14 ÷ 3 = 4 r 2   Repeat for larger numbers.	Bar models or draw diagrams to divide into groups. Each counter in the group represents 1, 10 or 100. E.g. 12 ÷ 3; 120 ÷ 3; 1200 ÷ 3.  	2 1 8 4 | 8 7 2 (carry 3) 8 6 r 2 5 | 4 3 2 (carry 3) 0 3 2 1 r 5 8) 2 5 7 3 Remainders can be expressed as a fraction or decimal (the remainder dividing by the divisor)	Lola has 28 stickers. She shares them equally between her 5 friends. How many stickers will each of her friends get? How many stickers will Lola have left? There are 29 children in the hall. Mr Bean asks the children to get into 4 equal teams. Explain why this is not possible.
	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	Place value, digits, left, right, decimal, tenths, hundreths, thousandths	Place value digit cards.	Place value grids.	Written method.	A school has 1000 pupils. Each pupil needs 12 coloured pencils. How many pencils does the school need to order? Sophie worked out that 4357 ÷ 100 = 435.7 Where has she gone wrong?
	Multiply and divide number mentally drawing upon known facts.	Divide, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divided by, divided into, arrays, inverse, short division, divisible, remainder, whole number, fraction remainder, decimal remainder, factor	Use mental knowledge. E.g. divide by 4 - 1/2 and 1/2 again; 280 ÷ 7 = 40 - use what you already know.	Use mental knowledge. E.g. divide by 4 - 1/2 and 1/2 again; 280 ÷ 7 = 40 - use what you already know.	Work these out mentally, using known facts to help you: 60 x 7 = 102 x 6 = 630 ÷ 9 = 320 ÷ 16 =	Jayden knows that 54 ÷ 9 = 6. Explain how he could use this calculation to work out 540 ÷ 90.
	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, halve, sharing, grouping, times tables, multipication facts, division facts, inverse, share equally, equal groups of, divided by, divided into, arrays, inverse, short division, divisible, remainder, whole number, fraction remainder, decimal remainder, factor	Abstract method. Link back to previous learning. Refer to a real life context in order to complete the written method.	Abstract method. Link back to previous learning. Refer to a real life context in order to complete the written method.	Long division (links to subtraction methods). 27 r 4 36) 9 7 6 - 7 2 2 5 6 - 2 5 2 0 0 4	12 ? 2 ÷ 6 = 212 What's the missing answer? Prove your answer. There are 188 children going on a school trip. Fourteen children fit in a minibus. How many minibuses will be needed to transport all of the children?

Creative Education Trust

Primary Mathematics Progression Map:

Fractions, percentages and decimals

Minimum expectations for Year…	NC Outcomes	Specific vocabulary	Concrete	Pictorial	Abstract	Reasoning and problem solving
Nursery/ Reception	Finding half of a set of objects through sharing into 2 equal groups.	Fraction Whole Half Equal			$\frac{1}{2}$ of 6 = 3	Can I find half of 5? Why/why not?
Year 1/Year 2	**Recognise, find and name a half and a quarter as equal parts of an object, shape or quantity.**	Numerator Denominator Half Quarter Equal			$\frac{1}{2}$ of 8 = 4 $\frac{1}{4}$ x 8 = 2	Choose a number of counters. Place them onto 2 plates so that there is the same number on each half. When can you do this What do you notice?
	Recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity.	One third A third Three quarters			1/4 of 8 = 2 2/4 x 8 = 4 3/4 x 8 = 6	What do you notice? ¼ x 4 = 1 ¼ x 8 = 2 ¼ x 12 = 3 Continue the pattern
	Recognise the equivalence of 2/4 and 1/2.	Equivalent				Which is the odd one out in this trio: ½ 2/4 ¼ Why?
Year 3/Year 4	Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.	Numerator Denominator Unit fraction Non-unit fraction			$\frac{3}{5}$ x 10 = 10 ÷ 5 = 2 2 x 3 = 6	1/10 x 10 = 1 2/10 x 10 = 2 3/10 x 10 = 3 Continue the pattern. What about 1/10 x 20? Use this to work out 2/10 x 20, etc.
	Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	Hundredths Tenths Ones			1 ÷ 100 = $\frac{1}{100}$ $\frac{1}{10}$ ÷ 10 = $\frac{1}{100}$	1/10 x 100 = 10 1/100 x 100 = 1 2/10 x 100 = 20 2/100 x 100 = 2 How can you use this to work out 6/10 of 200?
	Compare and order fractions.	Compare More than Less than Order Numerator Denominator			$\frac{3}{5} = \frac{12}{20}$ $\frac{3}{4} = \frac{15}{20}$ $\frac{3}{5} < \frac{3}{4}$	Imran put these fractions in order starting with the smallest. Are they in the correct order? Two fifths, three tenths, four twentieths How do you know?
	Recognise and show, using diagrams, equivalent fractions with small denominators.	Equivalent Fifths Sixths Twelfths Numerator Denominator			$\frac{2}{3} = \frac{4}{6} = \frac{8}{12}$ x2 x2	Which is the odd one out in each of these trios ½ 3/6 5/8 3/9 2/6 4/9 Why?
	Add and subtract fractions with the same denominator.	Sum Total Take-away Minus			$\frac{1}{5} + \frac{3}{5} = \frac{4}{5}$	The answer is 4/5, what is the question?
	Compare numbers with the same number of decimal places up to two decimal places.	Tenths Hundredths Integer More/less than	Physically count which is greater 	 1.1 > 0.6	1.34 1.43 1.21 1.12 Pupils use columns to compare digits starting from the left hand side.	Put the correct symbol < or > in each box; 3.03 ☐ 3.33 0.37 ☐ 0.32
	Round decimals with one decimal place to the nearest whole number.		 3 3.5 3.7 4		3.7 = 4 3.0 4.0 High five or four to the floor?	Circle each decimal which when rounded to the nearest whole number is 5. 5.3 5.7 5.2 5.8 Explain your reasoning
	Recognise and write decimal equivalents of any number of tenths or hundredths.	Equivalent Tenths Hundredths		 = 0.6 = $\frac{6}{10}$	0.6 = $\frac{6}{10}$ 0.34 = $\frac{34}{100}$	Write a decimal numbers (to one decimal place) which lies between a half and three quarters? And another . . . And another . . . And another
	Recognise and write decimal equivalents to 1/4; 1/2; 3/4.	Equivalent The same as…		 0.25 0.25 0.25 0.25	$\frac{1}{4}$ = 0.25 $\frac{1}{2}$ = 0.5	Put these numbers in the correct order, starting with the smallest. ¼ 0.75 5/10 Explain your thinking

Year 5/Year 6	Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number.	Improper -fraction Mixed Number Integer Numerator Denominator		 $\frac{7}{10} + \frac{8}{10} = \frac{15}{10} = 1\frac{5}{10} = 1\frac{1}{2}$		¾ and ¼ = 4/4 = 1 4/4 and ¼ = 5/4 = 1 ¼ 5/4 and ¼ = 6/4 = 1 ½ What do you notice? Continue the pattern until the total equals 2.
	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.	Equvalent Sum Total Difference Minus			$\frac{1}{3} = \frac{4}{12}$ $\frac{1}{4} = \frac{3}{12}$ $\frac{4}{12} + \frac{3}{12} = \frac{7}{12}$	The answer is 1 2/5 , what is the question?
	Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	Multiply Lots of Repeated addition		 $\frac{2}{3} \times 3 = \frac{6}{3} = 2$		5/3 of 24 = 40 Write a similar sentence where the answer is 56.
	Multiply simple pairs of proper fractions, writing the answer in its simplest form.	Simplify Numerator Denominator Lowest common multiple.	Use coloured strips of film/paper to lay over one another as in pictorial 		$\frac{2}{3} \times \frac{2}{5} = \frac{4}{15}$	The answer is 1/8 , what is the question (involving fractions / operations)
	Divide proper fractions by whole numbers.	Dividend Divisor	Fold strips of paper into 3rds then fold into 3 again to show $\frac{1}{3} \div 3$ 	 $\frac{1}{3} \div 3$	$\frac{1}{3} \div 3 = \frac{1}{(3x3)} = \frac{1}{9}$	Continue the pattern 1/3 ÷ 2 = 1/6 1/6 ÷ 2 = 1/12 1/12 ÷ 2 = 1/24 What do you notice?
	Divide pairs of simple fractions.	Reciprocal			$\frac{2}{3} \div \frac{3}{4} = \frac{(2x4)}{(3x3)} = \frac{8}{9}$	Ella says that 1/3 ÷ 1/4 must be twelfths. Is she correct? Why?
	Read, write, order and compare numbers with up to three decimal places.	Tenths Hundredths Thousandths More than Less than	Physically count which is greater 	 **1.13 > 1.02**	1.324 1.243 1.423 1.342 Pupils use columns to compare digits starting from the left hand side.	Put the correct symbol < or > in each box 4.627 ☐ 4.06 12.317 ☐ 12.31
	Round decimals with two decimal places to the nearest whole number and to one decimal place.	Integer	 3.43 3.4 3.4		3.43 = 3.4 High five or four to the floor?	Explain how to round decimal numbers to one decimal place?
	Multiply one-digit numbers with up to two decimal places by whole numbers.	Multiply Lots of Repeated addition	1.13 x 3 = 	1.13 x 3 = 	1 .13 x 3 3 .39	I multiply a number with three decimal places by a multiple of 10. The answer is approximately 3.21 What was my number and what did I multiply by?
	Understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator 100 as a decimal fraction.	Percent Equivalent Simplify Hundredth	 Make link to 100 square, write fraction as how many out of 100 are raised?		20% = $\frac{20}{100}$ = 0.2 20% = $\frac{1}{5}$ = 0.2	Spot the odd one out: 0.3 40/100 3/10 0.4 0.003 30/100 Explain your thinking.
	Find % of amounts.	Increase Decrease	 30% of £120 = £12 + £12 + £12 = £36		30 % of 120 = (120 ÷ 10) x 3 = 12 x 3 = 36 Also expressed as: 30% x 120	Jamie says that 90% of 500 must be more than half of 1000. Explain why he MUST be incorrect.