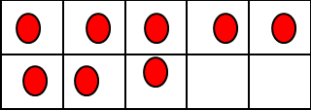
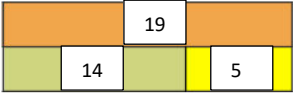
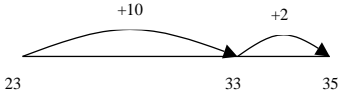
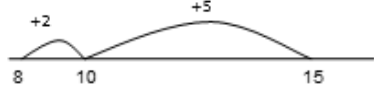
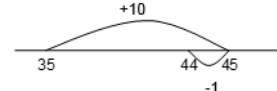
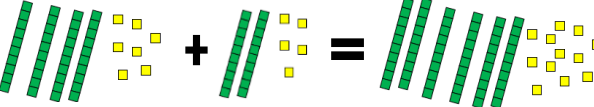



Addition

Calculation progression through the primary years

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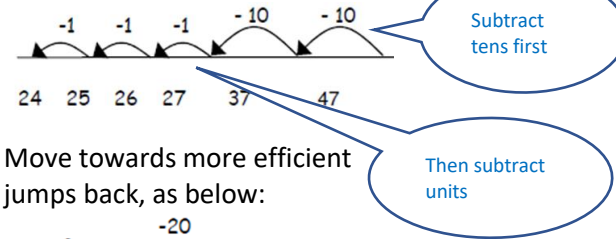
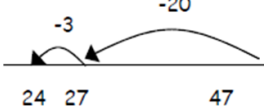
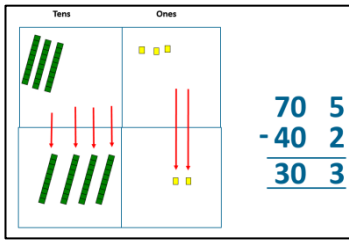
	Branches	Milestone 1	Method	Model/Examples
		Year 2 National Curriculum		
Addition Year 2	Number Bonds	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	Missing number problems e.g $14 + 5 = 10 + \square$ $32 + \square + \square = 100$ $35 = 1 + \square + 5$	Continue to use tens frame, numicon to support children to visualise number facts. Introduce the bar model.
	Mental Calculations	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	It is valuable to use a range of representations (also see Y1). Continue to use number lines to develop understanding of: <u>Counting on in tens and ones</u> $23 + 12 = 23 + 10 + 2$ $= 33 + 2$ $= 35$	  $14 + 5 = 19$     
	Written Methods		<u>Partitioning and bridging through 10.</u> The steps in addition often bridge through a multiple of 10 e.g. Children should be able to partition the 7 to relate adding the 2 and then the 5.	
	Inverse operations, estimating and checking answers	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	$8 + 7 = 15$ <u>Adding 9 or 11 by adding 10 and adjusting by 1</u> e.g. Add 9 by adding 10 and adjusting by 1	
	Problem Solving	solve problems with addition and subtraction: <ul style="list-style-type: none"> * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods <i>solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)</i>	$35 + 9 = 44$ <u>Towards a Written Method</u> <u>Partitioning in different ways and recombine</u> $47 + 25$ Leading to exchanging: 72 <u>Expanded written method</u> $40 + 7 + 20 + 5 =$ $40 + 20 + 7 + 5 =$ $60 + 12 = 72$	

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Subtraction

Calculation progression through the primary years

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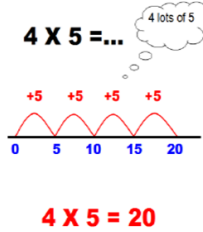
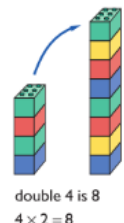
	Branches	Milestone 1	Method	Model/Examples
		Year 2 National Curriculum		
Subtraction Year 2	Number Bonds	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	Missing number problems	$52 - 8 = \square$; $\square - 20 = 25$; $22 = \square - 21$; $6 + \square + 3 = 11$
	Mental Calculations	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> * a two-digit number and ones * a two-digit number and tens * two two-digit numbers * adding three one-digit numbers show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	It is valuable to use a range of representations (also see Y1). Continue to use number lines to model take-away and difference. The link between the two may be supported by an image like this, with 23 being taken away from 47, leaving the difference, which is 24.	$47 - 23 = 24$ Partition the second number and subtract it in tens and units, as below:  Move towards more efficient jumps back, as below: 
	Written Methods			
	Inverse operations, estimating and checking answers	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	<u>Towards written methods</u> Recording addition and subtraction in expanded columns can support understanding of the quantity aspect of place value and prepare for efficient written methods with larger numbers. The numbers may be represented with apparatus. E.g. $89 - 35 = 54$	Introduce this method with examples where no exchanging is required. $89 - 35 = 54$
	Problem Solving	solve problems with addition and subtraction: <ul style="list-style-type: none"> * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods <i>solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)</i>		

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Multiplication

Calculation progression through the primary years

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	Branches	Milestone 1	Method	Models/Examples
		Year 2		
Multiplication Year 2	Multiplication and division facts	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward (copied from Number and Place Value)	Expressing multiplication as a number sentence using x Using understanding of the inverse and practical resources to solve missing number problems.	$7 \times 2 = \square$ $\square = 2 \times 7$ $7 \times \square = 14$ $14 = \square \times 7$ $\square \times 2 = 14$ $14 = 2 \times \square$ $\square \times \bigcirc = 14$ $14 = \square \times \bigcirc$
		recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers		
	Mental Calculations	show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	Develop understanding of multiplication using array and number lines (see Year 1). Include multiplications not in the 2, 5 or 10 times tables.	 $5 \times 3 = 15$ $3 \times 5 = 15$ $5 \times 3 = 3 + 3 + 3 + 3 + 3 = 15$ $3 \times 5 = 5 + 5 + 5 = 15$
	Written Methods	calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs		
	Properties of numbers: Multiples, Factors, Prime, Square, cube numbers		Begin to develop understanding of multiplication as scaling (3 times bigger/taller) <u>Towards written methods</u> Use jottings to develop an understanding of doubling two digit numbers.	 $4 \times 5 = 20$  double 4 is 8 $4 \times 2 = 8$
	Order of Operations			
	Inverse operations, estimating and checking answers			
	Problem Solving	solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts		

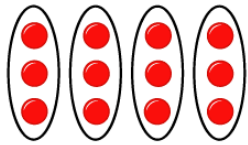
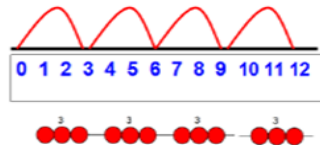
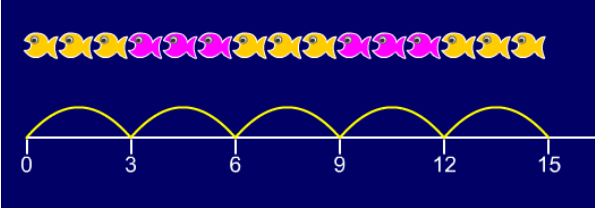
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Division

Calculation progression through the primary years

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Division Year 2

	Branches	Milestone 1	Method	Models/Examples
		Year 2		
Division Year 2	Multiplication and division facts	recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers	<p><u>\div = signs and missing numbers</u></p> <p>Know and understand sharing and grouping- introducing children to the \div sign.</p> <p>Children should continue to use grouping and sharing for division using practical apparatus, arrays and pictorial representations.</p>	<p> $6 \div 2 = \square$ $\square = 6 \div 2$ $6 \div \square = 3$ $3 = 6 \div \square$ $\square \div 2 = 3$ $3 = \square \div 2$ $\square \div \nabla = 3$ $3 = \square \div \nabla$ </p> <p>  $12 \div 3 = 4$ </p> <p>This represents $12 \div 3$, posed as how many groups of 3 are in 12? Pupils should also show that the same array can represent $12 \div 4 = 3$ if grouped horizontally.</p> <p>  $12 \div 3 = 4$ </p> <p>Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'. $15 \div 3 = 5$</p> <p>  </p>
	Mental Calculations	show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot		
	Written Methods	calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals ($=$) signs	<p><u>Grouping using a numberline</u></p> <p>Group from zero in jumps of the divisor to find our 'how many groups of 3 are there in 15?'. $15 \div 3 = 5$</p> <p>Continue work on arrays. Support children to understand how multiplication and division are inverse. Look at an array – what do you see?</p>	
	Properties of numbers: Multiples, Factors, Prime, Square, cube numbers			
	Order of Operations			
	Inverse operations, estimating and checking answers			
	Problem Solving	solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts		