

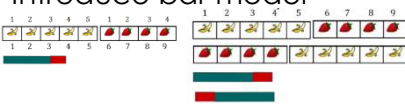
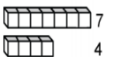
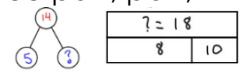
Marshlands Primary School

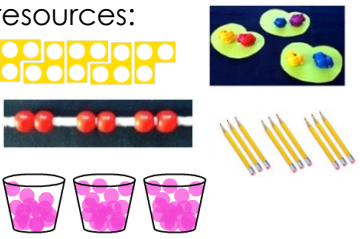
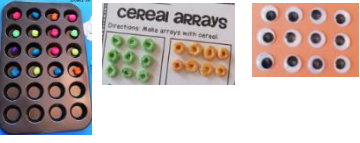
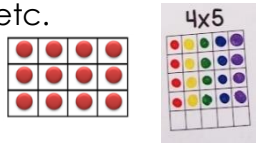
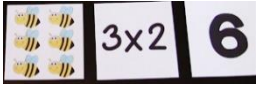
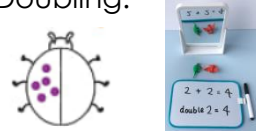


Calculation Policy 2020

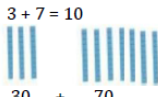
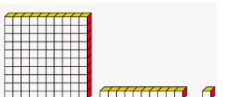
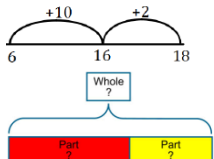
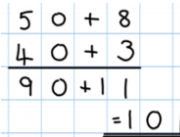
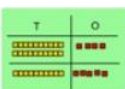
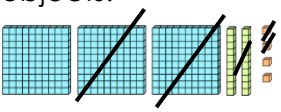
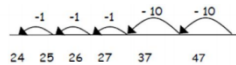
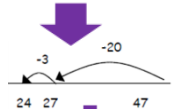
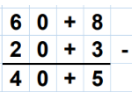
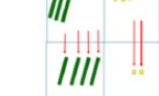
Mrs Sharp

Year 1

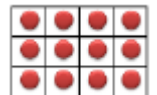
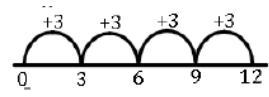
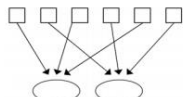
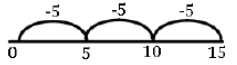
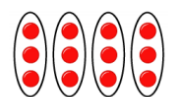
Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Addition + with numbers up to 20	Count all  Count on  Number bonds  Use of various items to support e.g. fingers, plastic animals, toys. 	Count all  Count on  Introduce bar model  Doubling and halving 	Introduce + and = to write simple number sentences: $5 - 1 = 4$ $4 + 1 = 5$ Missing number problems: $5 = \square + 1$ $\square + 1 = 8$ $15 = \square + 6$ Introduce part, part, whole: 	I bought 5 sweets; my friend gave me 4 more. How many sweets do I have now? 3 people were on a bus. 10 more got on. How many people are on the bus altogether. How many different additions can you find with a total of 9?	Read and write numbers to 100 in numerals, including 1 – 20 in words. Recall bonds to 10 and 20, and addition facts within 20. Count to and across 100.
Subtraction - from numbers up to 20	One less  Count out and then count how many are left: $7 - 4 = 3$  6 less than 10 is 4  How many more: 	Count back  Introduce bar model  Crossing out pictures $4 - 2 = \square$ 	Introduce + and = to write simple number sentences: $17 - 4 = 13$ $17 - 13 = 4$ Missing number problems: $4 = \square - 1$ $\square - 1 = 5$ Introduce part, part, whole 	I have £6. My brother has £1 less than me. How much money does he have? Use the numbers 3 to 8. How many pairs can you find which have a difference of 1?	Given a number, say one more or one less. Count to and over 100, forward and back, from any number. Subtract with one-digit and two-digit numbers to 20, including zero.
Vocab	put together, add, altogether, total, take away, difference between, more than, less than, equal				

Multiplication x2, x5, x10 (objects, arrays and pictorial)	Using familiar objects and resources:  Arrays using practical objects:  Multiplication to be taught as repeated addition.	Arrays using paint, stickers, etc.  Repeated images: How many legs?  Doubling: 	Begin to count in 2, 5 and 10 times tables. Introduce x and = to write simple number sentences and show alongside practical and pictorial activities.		Make connections between arrays, number patterns, and counting in twos, fives and tens. Begin to understand doubling using concrete objects and pictorial representations.
Division Group and share small quantities	Grouping with practical objects:  Finding halves and quarters 	Grouping pictures of familiar objects:  Grouping on a number line: 	Introduce ÷ and = to write simple number sentences and show alongside practical and pictorial activities.		Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities.
Vocab	lots of, groups of, arrays, counting in, sharing, double, half, quarter, equal, one each, two each,				

Year 2

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Addition + with 2 digit numbers	Use familiar objects and resources:    Use related facts up to 100:  $30 + 70 = 100$	Pictorial representations of objects:   Use of 100 squares, bar model and number lines:  	Introduce expanded column method, alongside practical to begin with:    $50 + 8 = 58$ $40 + 3 = 43$ $90 + 10 = 100$ Use to solve simple addition questions & missing number problems: $\square + 10 = 51$ $29 = \square + 10$	Use the digits 2, 3, 4, and 5. Make two 2 digit numbers. How many different totals are there? Can you make the same total in more than one way? How many different ways can you make £1 using 10p, 20p and 50p coins?	Recall and use addition and subtraction facts to 20 fluently Add a 2-digit number and ones Add a 2-digit number and tens Show that adding can be done in any order (the commutative law). Compare and order numbers to 100 using < > and = signs.
Subtraction - with 2 digit numbers	Use familiar objects and resources to actively take away:  	crossing out pictorial representations of practical objects:  Number lines  	Introduce expanded column method, alongside practical to begin with:   	There are 29 children in Class 3. 13 children have packed lunch and the rest have school dinner. How many children have school dinners?	Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100. Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.
Vocab	Add, more than, altogether, total, equal to, count on, take away, less, minus, subtract, difference, count back, how many left, How much less is ___? count on,				

Year 2

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Multiplication x2, x5, x10 Arrays and repeated addition	Find arrays in practical, everyday items and familiar resources:  Finding halves, quarters and thirds: 	Pictorial arrays:  Repeated images:  Repeated addition on a number line: 	Using number sentences and beginning to calculate mentally, including the use of fact families: $3 \times 4 = 12$ $4 \times 3 = 12$ $12 \div 4 = 3$ $12 \div 3 = 4$ Missing number problems: $20 = \underline{\quad} \times 5$ $3 = \underline{\quad} \div 6$	I saved 5p each week for 6 weeks. How much did I save altogether? If I save 5p each week, how many weeks will it take me to save 40p?	Use arrays to understand the commutative law of multiplication. Use arrays to make or draw multiplications and find the corresponding division facts. Write calculations using the multiplication ($\times$) division ($\div$) and equals (=) signs.
Division Group and share small quantities	Grouping everyday objects practically:  6 sweets shared between 2 people, how many do they each get? Sharing everyday objects practically:  There are six sweets, how many people can have 2 sweets each?	Repeated subtraction on a number line:  Arrays, linked to fact families.  $12 \div 3 = 4$	As above.	I had 20 lollies. I shared them between 5 friends. How many lollies did each friend get? I had 20 lollies; I put them into groups of 5. How many groups of 5 do I have?	Count in steps of 2, 3 and 5 from 0. Show that multiplication of 2 numbers can be done in any order and that division of one number by another cannot.
Vocab	share, share equally, one each, two each, group, lots of, array, divide, divided by, left over				

Key skills are skills that must be prioritised throughout the key stage in order to ensure children have a solid foundation before moving onto the next stage of learning.

Year 1

Count to and across 100

Read and write numbers in words and numerals to 20

Identify 1 more and 1 less of a given number

Recall number bonds to 20

Count in multiples of 2, 5 and 10

Recognise and name common 2d and 3d shapes

Year 2

Recognise the place value of each digit in a 2-digit number

Read and write numbers in words and numerals to 100

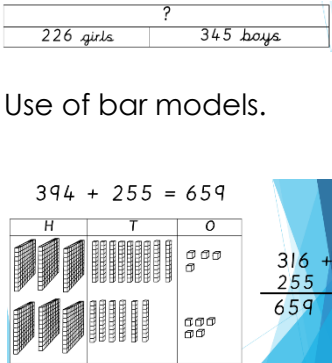
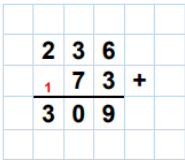
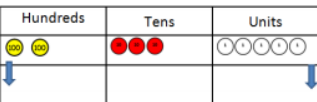
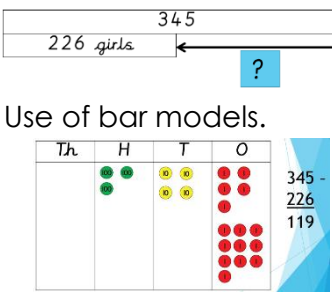
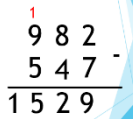
Recall number bonds to 20 fluently and use to derive related facts up to 100

Count in steps of 2, 3, and 5 from 0 and in tens from any numbers, forward and backward

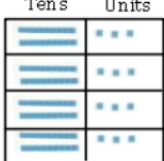
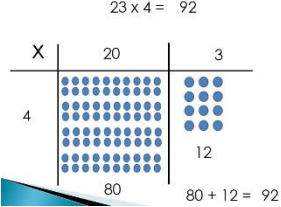
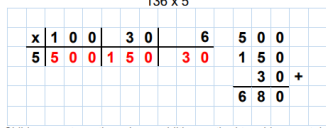
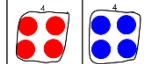
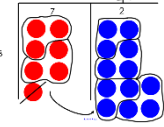
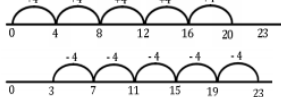
Recognise odd and even numbers

Understand commutative law for addition & multiplication

Year 3

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Addition + with 3-digit numbers	 Combining the tens and exchanging for a 100.	 Use of bar models. Pictorial representations of concrete methods.	Build on from previously taught expanded column by introducing compact column:  $\begin{array}{r} 1 \\ 45 \\ 28 + \\ 73 \end{array}$	Use the digits 1, 2, 3, 4 and 5. Make a 2-digit number and a 3-digit number. Add them together. Find ways of making 168, 483, 339.	Read and write numbers to 1000 in numerals and words. Add 2-digit numbers mentally, incl. those exceeding 100. Add a three-digit number and ones mentally (175 + 8) Add a three-digit number and tens mentally Add a three-digit number and hundreds mentally
Subtraction - with 3-digit numbers	 253 – 83 Move 83 down to show what's left (exchanging a hundred for tens)	 Use of bar models. Pictorial representations of concrete methods.	Build on from previously taught expanded column by introducing compact column: 	Two 3-digit numbers have a difference of 125. The digits of one number add to make 8. What are the numbers? How many ways can you do this?	Estimate and use inverse operations to check answers. Solve addition and subtraction 2-step problems Solve simple measure and money problems Find 1000 more or less than a given number.
Vocab	add, altogether, total to, sum, take away, less, minus, subtract, distance between, how many more, how many fewer / less than, how many left, how much less is_?, difference, exchange, increase, decrease, hundreds, value, digit, inverse				

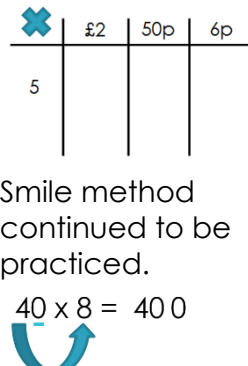
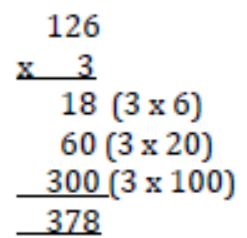
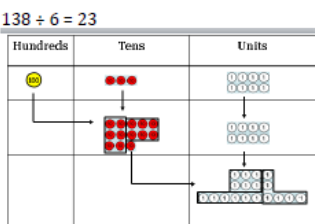
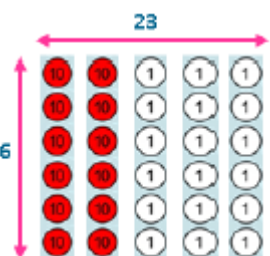
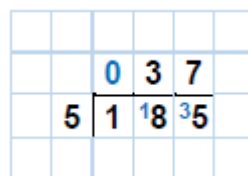
Year 3

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Multiplication $TU \times U$	Use of dienes and place value counters. $23 \times 4 = 92$ 	Understanding of dienes linked to grid method $23 \times 4 = 92$ 	Development of grid method. Use of smile method also needed. 136×5  Number sentences and missing number sentences $18 \times 4 = \square$ $\square \times 41 = 123$	Year 3 went on a trip. There were 6 groups with 14 children in each group. How many children went on the trip in total? Use the digits 2, 3, 4, 5 and 6. Make a multiplication ($U \times TU$) e.g. $2 \times 53 =$ Find different totals can you find? How many multiplications have the same total?	Recall and use multiplication facts for the 2, 3, 4, 5, 8 and 10 multiplication tables Write and calculate number statements using the multiplication tables they know, including 2-digit x single-digit Solve multiplication problems, including missing number problems
Division $TU \div U$	Use of place value counters (no exchanging to start with) $44 \div 4 = 11$  Moving on to exchanging units for tens 	Children to draw counters for given division questions and exchange tens for ones. Grouping on a number line. $23 \div 4 = 5 \text{ r}3$ 	Use times tables to support bus stop method. $\begin{array}{r} 23 \\ 3 \overline{)69} \end{array}$ *Children may benefit from writing times tables down to help count multiples.	3 children shared £69 equally. How much did they each receive? How many different divisions can you make? $36 \div ? = ?$ A farmer had 33 eggs. He put them into boxes of 6. How many full boxes did he have? How many eggs did he have left over? If he put them into boxes of 12, how many would be left over now?	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
Vocab	groups of, lots of, times, array, altogether, multiply, repeated addition, equal groups, grid method, multiple, product, tens, units, share equally, groups of, lots of, array, divide, division, grouping, number line, inverse, remainder				

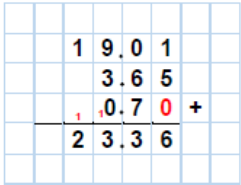
Year 4

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills																												
Addition + with 4-digit numbers	Follow process shown in year 3. Use place value counters to show the addition crossing one or more boundary.	? 4,523 2,321 Use of bar models. 3124 + 4232 = 7356 <table><tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td> ●●●● ●● </td><td> ● </td><td> ●● ●● </td><td> ●●●● ●● </td></tr></table> 3124 + 4232 = 7356 Pictorial representations of concrete methods.	Th	H	T	O	●●●● ●●	●	●● ●●	●●●● ●●	Continue to use compact column addition up to 4 digits. <table><tr><td>3</td><td>6</td><td>1</td><td>4</td><td></td></tr><tr><td>2</td><td>2</td><td>8</td><td>5</td><td>+</td></tr><tr><td>5</td><td>8</td><td>9</td><td>9</td><td></td></tr></table>	3	6	1	4		2	2	8	5	+	5	8	9	9		I walked 1360m, 2764m and then 2188m. How much further do I have to walk until I have travelled 7 km? Use the digits 1 – 9. Choose six of them and make two 4-digit numbers. Find the total/difference. Score a point for every zero you can get in your total.	Select most appropriate method: mental, jottings or written and explain why. Recognise the place value of each digit in a four-digit number. Solve 2-step problems in context, deciding which operations and methods to use and why. Find 1000 more or less than a given number. Estimate and use inverse operations to check answers. Round any number to the nearest 10, 100 or 1000.					
Th	H	T	O																														
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3	6	1	4																														
2	2	8	5	+																													
5	8	9	9																														
Subtraction - with 4-digit numbers	Follow process shown in year 3. Use place value counters to show subtraction through exchanging from one or more column, including through zero.	5,251 4,523 ← ? → Use of bar models. 8486 - 3271 = 5215 <table><tr><th>Th</th><th>H</th><th>T</th><th>O</th></tr><tr><td> ●●●● ●● </td><td> ●● </td><td> ●●●● ●● </td><td> ●●●● ●● </td></tr></table> Pictorial representations of concrete methods.	Th	H	T	O	●●●● ●●	●●	●●●● ●●	●●●● ●●	Continue to use compact column subtraction up to 4 digits. <table><tr><td></td><td></td><td>6</td><td></td><td></td></tr><tr><td>2</td><td>7</td><td>15</td><td>4</td><td></td></tr><tr><td>1</td><td>5</td><td>6</td><td>2</td><td>-</td></tr><tr><td>1</td><td>1</td><td>9</td><td>2</td><td></td></tr></table>			6			2	7	15	4		1	5	6	2	-	1	1	9	2		Use the digits 2 to 8 and make two 4-digit numbers. Find the difference. What's the closest difference you get to ...4000? How many pairs of numbers can you find where the difference is: a 4-digit number with consecutive digits?	Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc. Estimate and use inverse operations to check answers. Solve 2-step problems in context, deciding which operations and methods to use and why. Count backwards through zero, including negative numbers.
Th	H	T	O																														
●●●● ●●	●●	●●●● ●●	●●●● ●●																														
		6																															
2	7	15	4																														
1	5	6	2	-																													
1	1	9	2																														
Vocab	hundreds, thousands, digits, inverse difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse																																

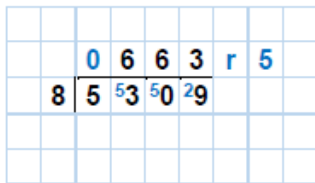
Year 4

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Multiplication HTU x U	Use of dienes and place value counters.	Consolidation of grid method:  Smile method continued to be practiced. $40 \times 8 = 400$	Introduce expanded column method: 	In one week, 163 people visited the museum each day. How many people visited in total? U x HTU = 820. How many ways can you solve this?	Count in multiples of 6, 7, 9, 25 and 1000 Recall multiplication facts for all multiplication tables up to 12 x 12. Use place value, known facts and derived facts to multiply mentally, e.g. multiply by 1, 10, 100, by 0, or to multiply 3 numbers. Use commutativity and other strategies mentally $3 \times 6 = 6 \times 3$, $2 \times 6 \times 5 = 10 \times 6$, $39 \times 7 = 30 \times 7 + 9 \times 7$. Solve problems with increasingly complex multiplication in a range of contexts.
Division HTU ÷ U	Use of place value counters 	Result of sharing/grouping counters during 'concrete stage'  Check using inverse	Short division method HTU ÷ U, no remainders at first.  *Children may benefit from writing times tables down to help count multiples.	436 children need to be put into teams for sports day. How many different ways could the children be grouped equally? Robbie has 150 stickers. He kept 12 and shared the rest equally between 6 friends. How many stickers did each of his friends get?	Recall multiplication and division facts for all numbers up to 12 x 12. Use place value, known and derived facts to multiply and divide mentally, including: multiplying and dividing by 10 and 100 and 1. Pupils practise to become fluent in the formal written method of short division with exact answers when dividing by a one-digit number Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example $200 \times 3 = 600$ so $600 \div 3 = 200$ Pupils solve two-step problems in contexts.
Vocab	groups of, lots of, times, array, altogether, multiply, repeated addition, equal groups, grid method, multiple, product, tens, units, share equally, groups of, lots of, array, divide, division, inverse, short division, carry, remainder, multiple				

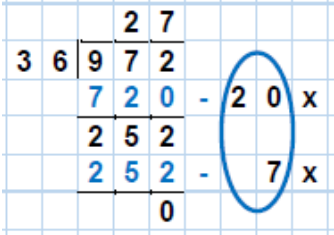
Years 5 & 6

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Addition Including decimals	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). Add and subtract decimals values up to thousandths.  <i>(Refer to process in Year 3 and 4. Children should be able to use column methods efficiently to work at this level).</i>			I travelled to 3 different cities. The distances of my journeys were: 1982 m, 15642 m and 12108m. What was the total distance travelled in metres? How far did I travel in km? My friend travelled 31.9km, how much further did he travel than me? Use the digits 0 to 7. Make two decimals (units, tenths, hundredths and thousandths). Add them and find the nearest whole number to your answer. How many totals can you find where the nearest whole numbers is...4, 5, 12? Etc.	The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation.
Subtraction Including decimals				Use the digits 1 to 9. Make 2 decimals (unit, tenths, hundredths and thousandths). Find the difference. How many differences can you find which equal 1.234? Use the digits 3, 4, 6 and 7. Make a 4 digit number and subtract it from 10,000. What are the largest and smallest answers? Which answer is closest to 5000? Find the digital roots of your answers. What do you notice?	With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.
Vocab	hundreds, thousands, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit				

Year 5

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Multiplication ThHTU x U			Compact column multiplication:  Including decimals:	There are 24 bottles in a crate. Each bottle has a capacity of 720ml. what is the total amount in litres? Make 5 different 2 digit numbers e.g. 56, 74, 31, 65, 83. Multiply them each by 101. What do you notice? What happens when you multiply each one by 1001?	Identify multiples and factors, using knowledge of multiplication tables to 12x12. Solve problems where larger numbers are decomposed into their factors Multiply and divide integers and decimals by 10, 100 and 1000 Recognise and use square and cube numbers and their notation
Division ThHTU ÷ U			Bus stop method including remainders:  This answer can be represented as: 663 r5 663 5/8 or rounded as appropriate to the problem involved	6 people won £8724 on the lottery. They spent £650 on a party to celebrate then shared the rest. How much did they each receive? How many divisions can you create which leave a remainder of 4/5, 2/3...etc?	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two number. Solve problems involving multiplication and division where larger numbers are decomposed into their factors. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. Use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Work out whether a number up to 100 is prime, and recall prime numbers to 19. 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 Use multiplication and division as inverses.
Vocab	groups of, lots of, times, array, altogether, multiply, repeated addition, equal groups, grid method, multiple, product, tens, units, share equally, groups of, lots of, array, divide, division, inverse, short division, carry, remainder, multiple				

Year 6

Calculation	Concrete	Pictorial	Abstract Methods	Using and Applying	Key Skills
Multiplication ThHTU x U					Recall multiplication facts for all times tables up to 12 x 12 (as Y4 and Y5). Multiply multi-digit numbers, up to 4-digit x 2-digit using long multiplication. Perform mental calculations with mixed operations and large numbers.
Division ThHTU ÷ U			Introduce long division by chunking for dividing by 2 digit numbers: 	A farmer had 450 eggs. 18 smashed so he put the rest into boxes of 15. How many boxes did he use? How many divisions can you create which result in a recurring decimal? Can you find a pattern in the numbers you used? Choose a 4 digit number and investigate fractional and decimal remainders when you divide by 9. What patterns do you notice?	Recall and use multiplication and division facts for all numbers to 12 x 12 for more complex calculations 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. Use short division where appropriate. Perform mental calculations, including with mixed operations and large numbers. Identify common factors, common multiples and prime numbers. Solve problems involving all 4 operations. Use estimation to check answers to calculations and determine accuracy, in the context of a problem. Use written division methods in cases where the answer has up to two decimal places.
Vocab	groups of, lots of, times, array, altogether, multiply, repeated addition, equal groups, grid method, multiple, product, common factor, tens, units, share equally, groups of, lots of, array, divide, division, inverse, short division, carry, remainder, multiple				

