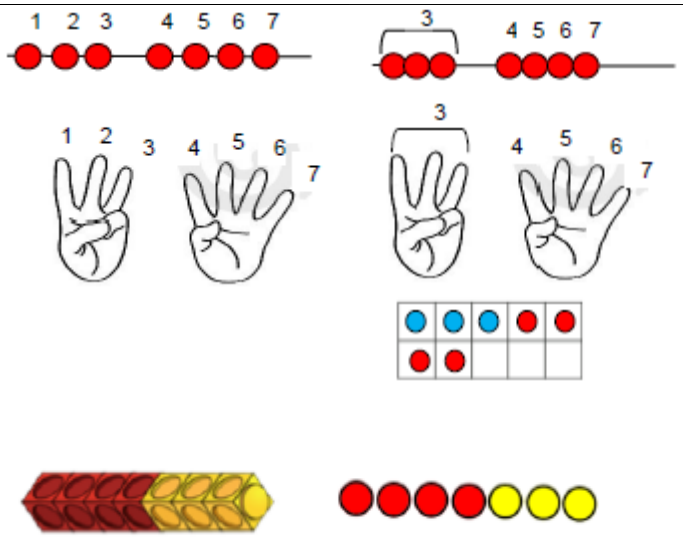
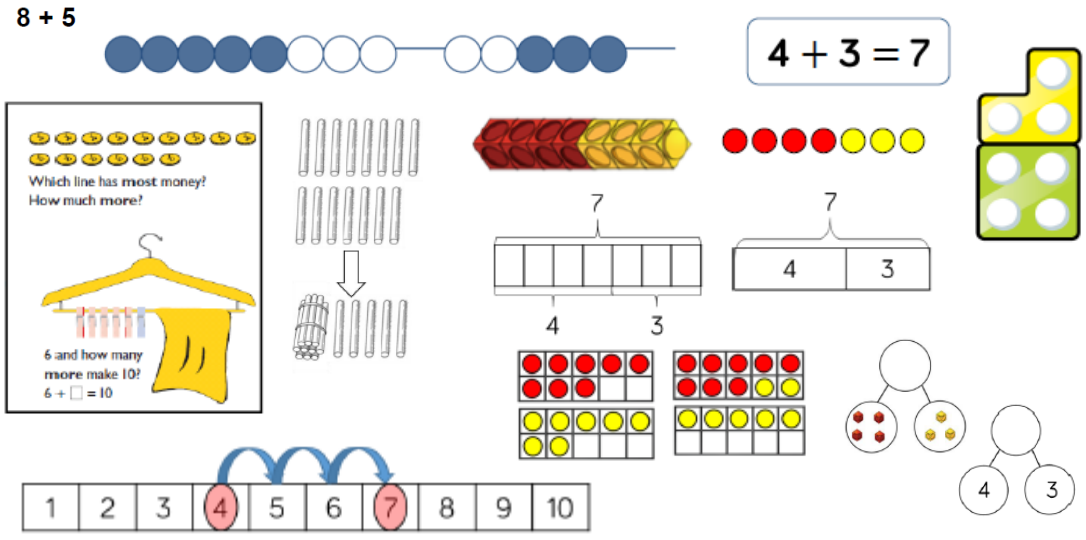
CALCULATION GUIDANCE

EYFS Addition

Key Language	add, addend, addition, more, make, sum, total, altogether, double, one more, two more, ten more, equals, is equal to, is the same as, number bonds/pairs/facts, partition, value, worth, place value, ones, tens, count on
Early Learning Goals (all Mathematics)	**Number** • Have a deep understanding of number to 10, including the composition of each number • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **Numerical Patterns** • Verbally count beyond 20, recognising the pattern of the counting system • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally
Representations to support mental and written calculations	
Stem sentences	…. is ….more than …. You need … more to make …. There are …. and ….. ….. is equal to …. plus …. ….. plus …. is equal to ….
Teaching guidance	• The one-one principle – children assign one number name to each object that is being counted. Encourage children to line up objects and say the number name as they touch them. • Stable-order principle – children understand that when counting, the numbers need to be said in a certain order. Encourage children to count aloud to larger numbers first before counting actual objects to higher numbers. • Cardinal principle – children understand that the l number name assigned to the final object in a group, is the total number of objects in the group. • Abstraction – anything can be counted (not just objects) e.g. claps, clicks, jumps. Encourage children to visualise objects in their head.

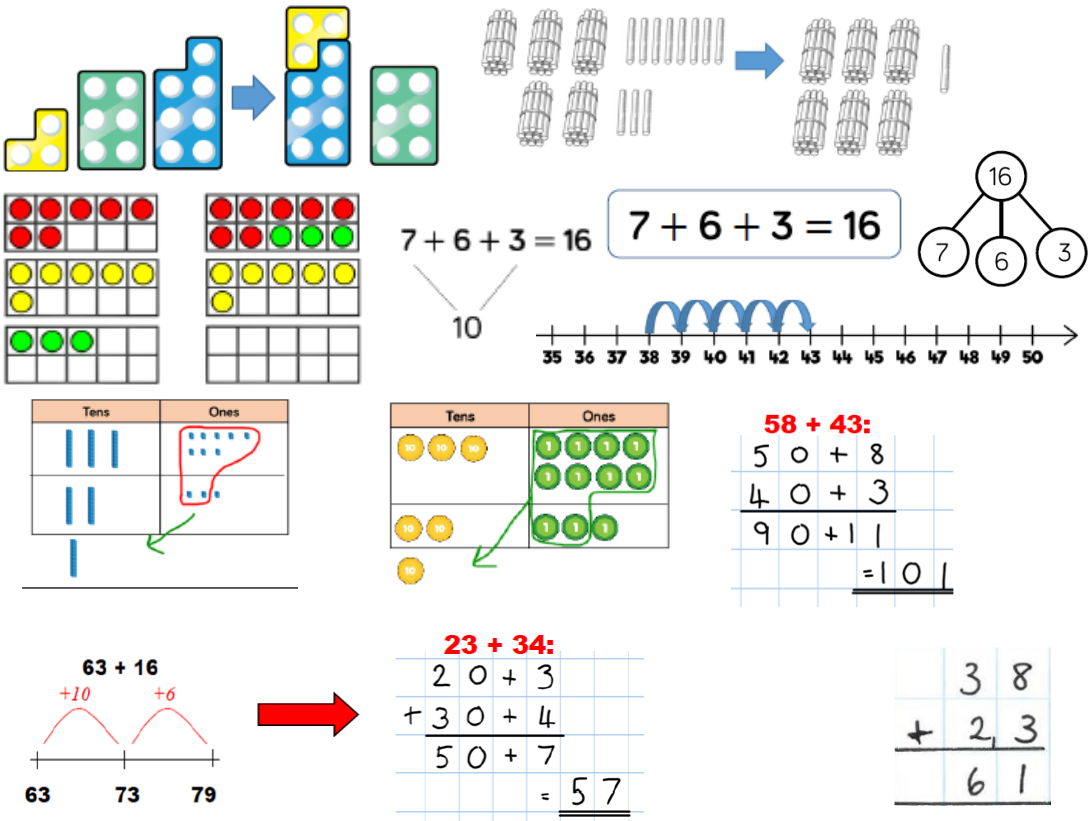
	• Order-irrelevance principle – the order we count objects in is irrelevant. There is still the same number. Encourage children to count from top-bottom, right-left and in reverse. Move objects and ask them to count again. • Encourage children to reason and problem solve e.g. How many objects are there in total if 5 are hidden? • Integrate Maths into routines throughout the day, through stories, rhymes etc • Encourage children to use manipulatives and ensure children understand the link between them and the mathematical ideas they represent.
Early Years Framework Guidance (all Mathematics)	• Count confidently to 10 • Develop a deep understanding of numbers to 10, the relationships between those numbers and the relationships within those numbers • Children should use manipulatives to develop a secure base of knowledge and vocabulary • Children develop their spatial reasoning skills • Children look for patterns and relationships and spot connections

Year 1 Addition

Key Language	add, addend, addition, more, plus, make, sum, total, altogether, double, near double, near double, one more, two more, equals, is equal to, is the same as, number bonds/pairs/facts, column, partition, value, worth, place value, ones, tens, one more, ten more, number bonds/pairs, most
NC requirements: Mental and written calculations (non-statutory guidance in italics)	• Count to and across 100, forwards, beginning with 0 or 1, or any given number • Identify and represent numbers using objects and pictorial representations including the number line, and use the language of equal to, more than, most • Read and interpret mathematical statements involving addition and equals signs • Represent and use number bonds within 20 • Add one-digit and two-digit numbers to 20, including 0 • Solve one-step and two-step problems that involve addition using concrete objects and pictorial representations • *Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example 9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9). Thy should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.* • *They discuss and solve problems in familiar practical contexts, including using quantities. include the terms put together, add, altogether, total so that pupils develop the concept of addition and are enabled to use this operation flexibly.* **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition
Representations to support mental and written calculations	
Stem sentences	…. is ….more than …. You need … more to make …. There are …. and ….. We can write this as …. plus …. The ….. represents the …. ….. is equal to …. plus …. ….. plus …. Is equal to …. …. and …. are addends. …. is the sum

Teaching guidance	• addend + addend = sum • When adding numbers to 10, children can explore both aggregation and augmentation. • The part-whole model, discrete and continuous bar model, number shapes and ten frame support aggregation. • The combination bar model, ten frame, bead string and number track all support augmentation. • When adding one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten. • Different manipulatives can be used to represent this exchange. Use concrete resources alongside number lines to support children in understanding how to partition their jumps.
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Compare, describe, and solve practical problems for lengths and heights, mass and weight, capacity and volume, time • Sequence events in chronological order

Year 2 Addition

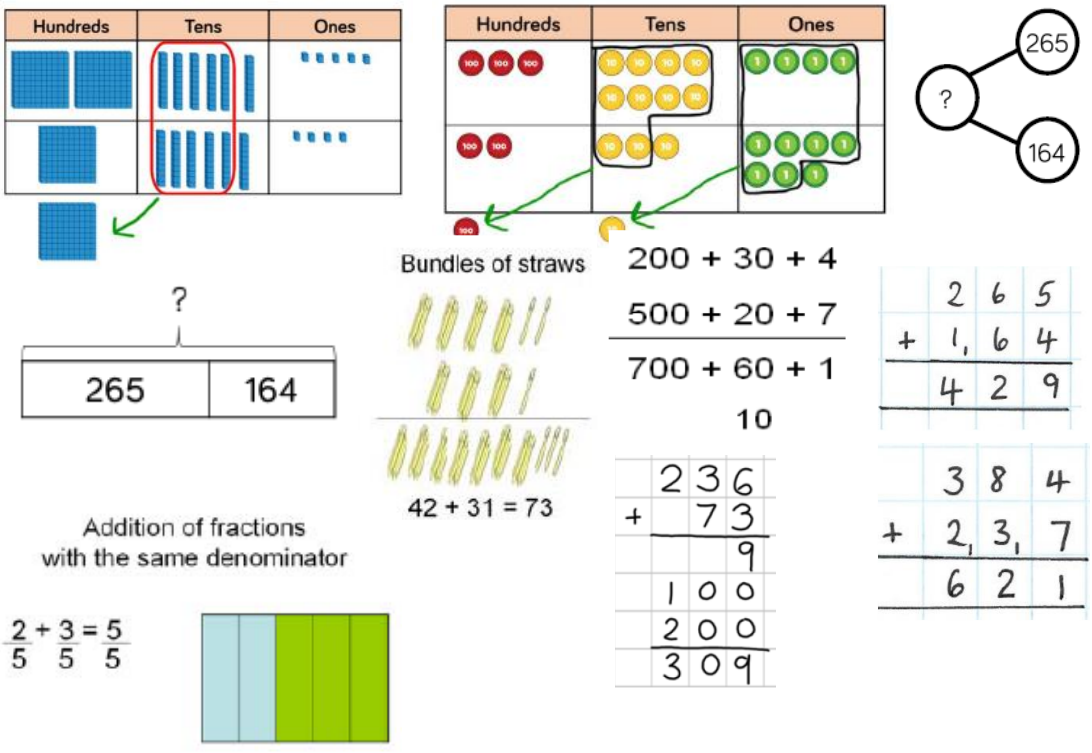
Key Language	add, addend, addition, more, plus, make, sum, total, altogether, double, near double, one more, two more, equals, is equal to, is the same as, number bonds/pairs/facts, column, partition, value, worth, place value, ones, tens hundreds
NC requirements: Mental and written calculations (non-statutory guidance in italics)	• Solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures • Apply increasing knowledge of mental methods • Recall and use addition facts to 20 fluently, and derive and use related facts up to 100 • Add numbers using concrete objects, pictorial representations and mentally including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; adding three one-digit numbers **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition • Apply increasing knowledge of written methods • Show that addition of two numbers can be done in any order (commutative) • Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems • *Pupils practise addition to 20 to become increasingly fluent in deriving facts such as 3 + 7 = 10, to calculate 30 + 70 = 100* • *They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition.* • *Recording addition in columns supports place value and prepares for formal written methods with larger numbers.*
Representations to support mental and written calculations	

Stem sentences	…. is ….more than …. You need … more to make …. There are …. and ….. We can write this as …. plus …. The ….. represents the …. ….. is equal to …. plus .... ….. plus …. Is equal to …. …. and …. are addends. …. is the sum We line up the ones: 2 ones plus 5 ones equals 7 ones We line up the tens: 3 tens and 4 tens equals 7 tens 7 ones plus 5 ones is equal to 12 ones I regroup 12 ones into 1 ten and 2 ones and place the 10 in the tens column If the column sum is equal to 10 or more, we must regroup. If the column sum is equal to 100 or more, we must regroup.
Teaching guidance	• addend + addend = sum • Use empty number lines, concrete equipment, hundred squares etc. to build confidence and fluency in mental addition skills • Add pairs of two-digit numbers, moving to the partitioned column method when secure adding tens and ones. Only provide examples that do not cross the tens boundary until they are secure with the method itself. • Once children can add a multiple of ten to a two=digit number mentally (e.g. 80 +11) they are ready for adding pairs of two-digit numbers that **do** cross the tens boundary (e.g. 58 +43). • When adding three one-digit numbers, children should be encouraged to look for number bonds to 10 or doubles to add the numbers more efficiently. This supports their understanding of commutativity. • Manipulatives that highlight number bonds to 10 are effective whe adding three one-digit numbers. • When adding single digits to a two-digit number, children should be encouraged to count on from the larger number • They should also apply their knowledge of number bonds to add more efficiently e.g. 8 + 5 = 13 so 38 + 5 = 43 • At this stage, encourage children to use the formal column method when calculating alongside straws, Base 10 or place value counters. As numbers become larger, straws become less efficient.
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• *Pupils should count in fractions up to 10, starting from any number and using the ½ and 2/4 equivalence on the number line. This reinforces the concept of fractions as numbers and that they can add up to more than one.* • Find different combinations of coins that equal the same amounts of money • Solve simple problems in a practical context involving addition of money of the same unit • Ask and answer simple questions in statistics

Year 3 Addition

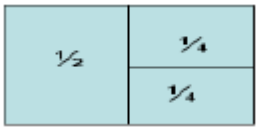
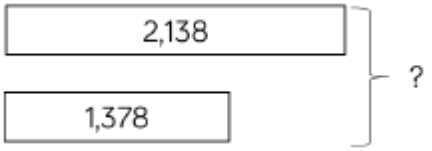
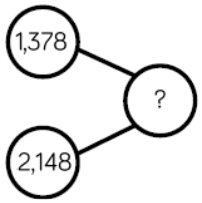
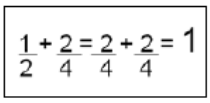
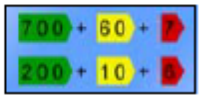
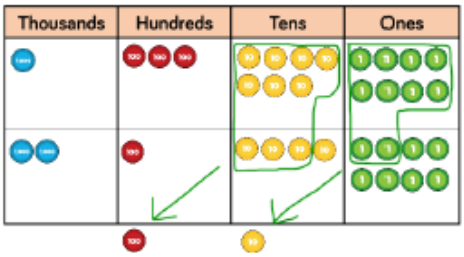
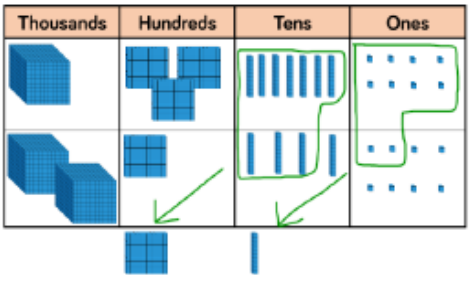
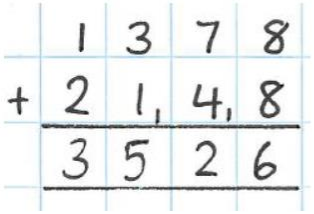
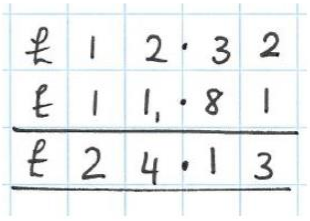
Key Language	add, addend, addition, more, plus, make, sum, total, altogether, double, near double, one more, two more, equals, is equal to, is the same as, number bonds/pairs/facts, column, partition, value, worth, place value, ones, tens hundreds

NC requirements: Mental and written calculations (non-statutory guidance in italics)	• add numbers including
	  • a three-digit number and ones
	  • a three-digit number and tens
	  • a three-digit number and hundreds
	• estimate the answer to a calculation and use inverse operations to check answers
	• solve problems, including missing number problems, using number facts, place value, and more complex addition
	• add numbers with up to three digits, using formal written methods of columnar addition
	• *Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100*
	• *Pupils use their understanding of place value and partitioning , and practise using columnar addition with increasingly large numbers up to three digits to become fluent*
	
	Common mental calculation strategies:
	Partitioning and recombining
	Doubles and near doubles
	Use number pairs to 10 and 100
	Adding near multiples of ten and adjusting
	Using patterns of similar calculations
	Using known number facts
	Bridging though ten, hundred
	Complementary addition

Representations to support mental and written calculations	
Stem sentences	…. is ….more than …. You need … more to make …. There are …. and ….. We can write this as …. plus …. The ….. represents the …. ….. is equal to …. plus …. ….. plus …. Is equal to …. …. and …. are addends. …. is the sum If the column sum is equal to 10 or more, we must regroup. If the column sum is equal to 100 or more, we must regroup.

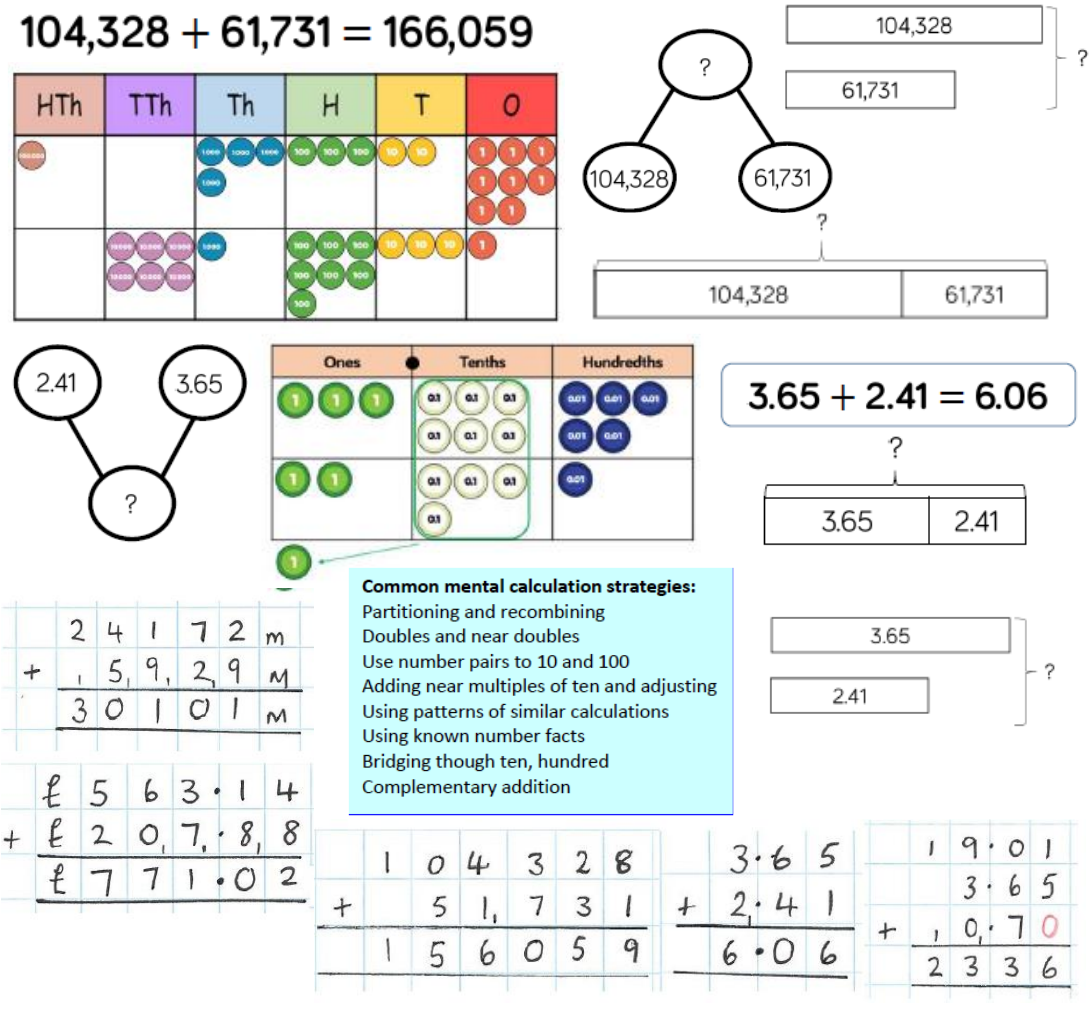
Teaching guidance	• addend + addend = sum • Encourage children to use formal column method when calculating, alongside concrete and pictorial representations • Children can also use a number line to count on to find the total. Encourage them to jump in multiples of tens and hundreds to become more efficient. • Base 10 and place value counters are the most efficient manipulatives when adding 3-digit numbers. • Ensure calculations are written alongside any manipulatives to make links • Add ones, then tens, then hundreds in this order. • Ensure that when using column method, you state '*three tens add seven tens'*, not '3 add 7', which equals '*ten tens or one hundred*' to preserve place value understanding. • Ensure that children position the digits correctly in columns to preserve place value. • Children should first add without an exchange before moving onto addition with exchange. • At this stage, encourage children to use the formal column method when calculating alongside Base 10 or place value counters.
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Solve number problems and practical problems involving number and place value • find 10 or 100 more than a given number • *use partitioning relating to place value using varied and increasingly complex problems e.g. 146 = 100 + 40 and 6, 146 = 130 + 16* • add fractions with the same denominator within one whole • add lengths, (m/cm/mm),mass (g/kg) and volume/capacity (l/ml) • add amounts of money to give change, using both £ and p in practical contexts • *Pupils continue to become fluent in recognising the value of coins by adding amounts, including mixed units, and giving change using manageable amounts* • solve one-step and two-step questions (e.g. How many more?) Using information presented in scaled bar charts and pictograms and tables

Year 4 Addition

Key Language	add, addend, addition, more, plus, make, sum, total, altogether, double, near double, one more, two more, equals, is equal to, is the same as, number bonds/pairs/facts, column, partition, value, worth, place value, ones, tens hundreds, thousand, ten thousand, hundred thousand, million
NC requirements: Mental calculations and written calculations (non-statutory guidance in italics)	• Add numbers with up to 4 digits using the formal written method of columnar addition where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve addition two-step problems in contexts • *Pupils continue to practise mental methods with increasingly larger numbers to aid fluency* **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition
Representations to support mental and written calculations	        
Stem sentences	…. is ….more than …. You need … more to make …. There are …. and ….. We can write this as …. plus …. The ….. represents the …. ….. is equal to …. plus …. ….. plus …. Is equal to …. …. and …. are addends. …. is the sum If the column sum is equal to 10 or more, we must regroup. If the column sum is equal to 100 or more, we must regroup.

Teaching guidance	• addend + addend = sum • Encourage children to use formal column method when calculating, alongside concrete and pictorial representations • Children can also use a number line to count on to find the total. Encourage them to jump in multiples of tens and hundreds to become more efficient. • Base 10 and place value counters are the most efficient manipulatives when numbers with up to 4 digits. • Ensure calculations are written alongside any manipulatives to make links • Plain counters on a place value grid can also be used to support learning • Add ones, then tens, then hundreds in this order. • Ensure that when using column method, you state '*three hundreds add seven hundreds'*, not '3 add 7', which equals '*ten hundreds or one thousand'* to preserve place value understanding. • Ensure that children position the digits correctly in columns to preserve place value. • Children should first add without an exchange before moving onto addition with exchange. • Children should first be confident with the expanded column addition before moving onto the compact method • Values are exchanged below the equals lines in column addition (see diagram)
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Find 1000 more than a given number • Round any number to the nearest 10, 100 or 1000 • Solve number and practical problems with increasingly large positive numbers • *Counting in tens and hundreds and other multiples* • Add fractions with the same denominator • Pupils add fractions with the same denominator • Counting forwards in simple fractions and decimals • Find the area of rectilinear shapes by counting squares • Calculate different measures including money in pounds and pence • Solve comparison and sum problems using information presented in bar charts, pictograms, tables and other graphs

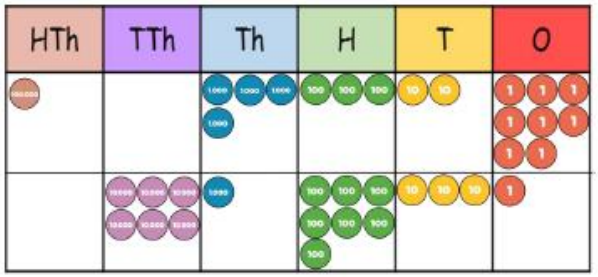
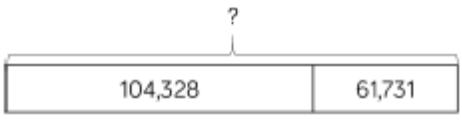
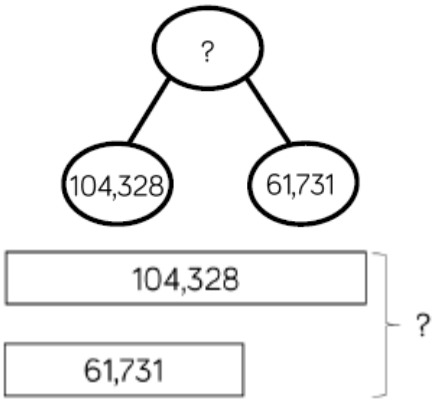
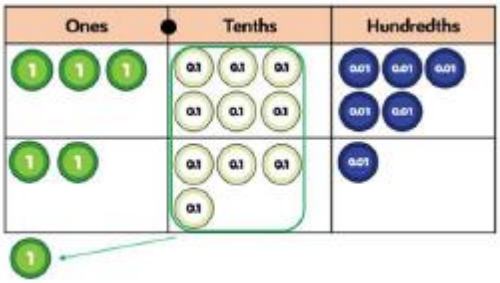
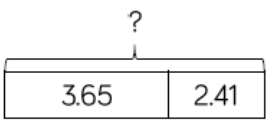
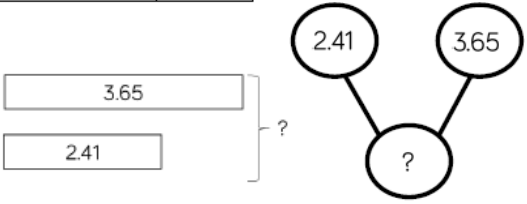
Year 5 Addition

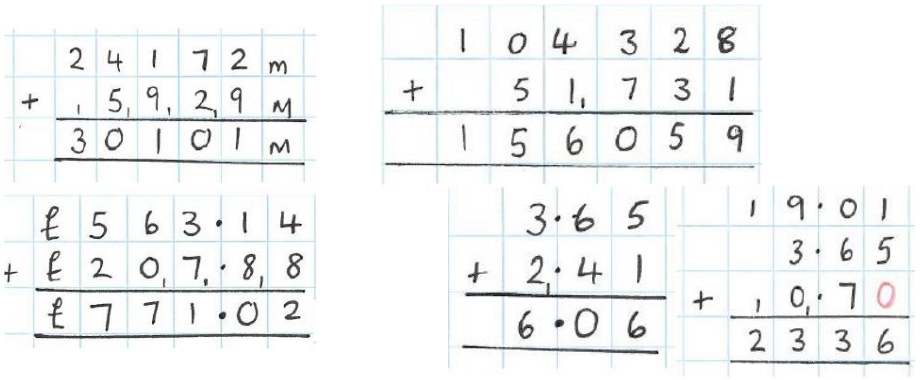
Key Language	add, addend, addition, more, plus, make, sum, total, altogether, double, near double, one more, two more, equals, is equal to, is the same as, number bonds/pairs/facts, column, partition, value, worth, place value, ones, tens hundreds, thousand, ten thousand, hundred thousand, million, decimals, decimal point, tenth, hundredth
NC requirements: Mental calculations and written calculations (non-statutory guidance in italics)	• Count forwards in steps of powers of 10, for any given number up to 1 000 000 • Count forwards with positive and negative whole numbers, including through zero • Add numbers mentally with increasingly large numbers • Solve number problems and practical problems involving numbers to 1,000 000, decimal and negative numbers • Add whole numbers with more than 4 digits, including using formal written methods • Solve addition multi-step problems in context, deciding which operations and methods to use and why • Solve problems involving addition and other operations, including understanding of the meaning of the equals sign • *Pupils practise using the formal written method of columnar addition with increasingly large numbers to aid fluency.* • *They practise mental calculations with increasingly large numbers to aid fluency.*
Representations to support mental and written calculations	

Stem sentences	…. is ….more than …. You need … more to make …. There are …. and ….. We can write this as …. plus …. The ….. represents the …. ….. is equal to …. plus .... ….. plus …. Is equal to …. …. and …. are addends. …. is the sum If the column sum is equal to 10 or more, we must regroup. If the column sum is equal to 100 or more, we must regroup.
Teaching guidance	• addend + addend = sum • Encourage children to use formal column method when calculating, alongside concrete and pictorial representations • Place value counters or plain counters on a place value grid are the most effective concrete resources when adding numbers with more than 4 digits or when adding decimals with 1,2 and then 3 decimal places • Ensure children have experience of adding decimals with a variety of decimal places. This includes putting this into context when adding money and other measures • Ensure calculations are written alongside any manipulatives to make links • Ensure that when using column method, you state '*three tens add seven tens*', not '3 add 7', which equals '*ten tens or one hundred*' to preserve place value understanding. • Ensure when adding decimals, you state '6 tenths add 7 tenths' to reinforce place value • Empty decimal places can be filled with a zero to converse place value in the column • Ensure that children position the digits correctly in columns to preserve place value. • The decimal point should be aligned in the same way as the other place value columns, and must be the in the same column as the answer • At this stage, children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Count forwards in steps of powers of 10, for any given number up to 1 000 000 • Count forwards with positive and negative whole numbers, including through zero • Round up any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 • Solve number problems and practical problems involving numbers up to 1 000 000, decimal and negative numbers • *They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule* • Solve problems using addition and other operations, including the meaning of the equals sign • *Distributivity can be expressed as a(b + c) = ab + ac* • Add fractions with the same denominator and denominators that are multiples of the same number • Round decimals with two decimal places to the nearest whole number and to one decimal value • Solve problems involving number up to three decimal places • *Pupils practise adding fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding fractions to calculations that exceed 1 as a mixed number*

	• *Pupils continue to practise counting forwards in simple fractions* • *Pupils extend counting from Year 4, using decimals and fractions including bridging zero, for example on a number line* • *Mentally add and subtract tenths, and one-digit whole numbers and tenths* • *They practise adding decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (e.g. 0.83 + 0.17 = 1)* • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Use addition to solve measures involving measure using decimal notation, including scaling • *Calculate perimeter of rectangles and related composite shapes. Missing measures can be expressed algebraically, e.g. 4 + 2b = 20* • *Pupils use addition in problems involving time and money* • Use the properties of rectangles to deduce related facts and find missing lengths and angles • Solve comparison, sum and difference problems using information presented in a line graph

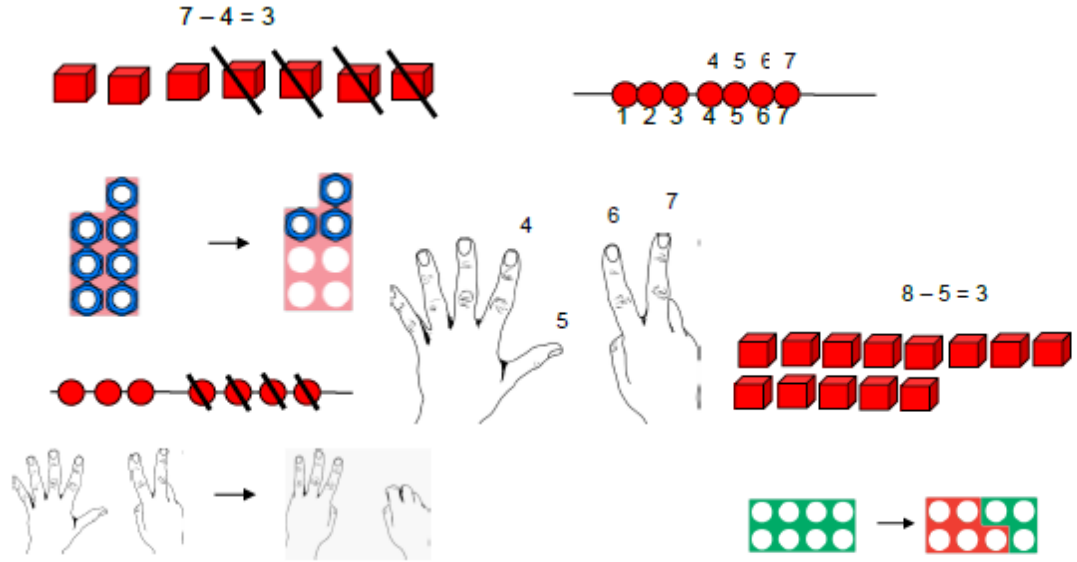
Year 6 Addition

Key Language	add, addend, addition, more, plus, make, sum, total, altogether, double, near double, one more, two more, equals, is equal to, is the same as, number bonds/pairs/facts, column, partition, value, worth, place value, ones, tens hundreds, thousand, ten thousand, hundred thousand, million, decimals, decimal point, tenth, hundredth
NC requirements: Mental calculations and written calculations (non-statutory guidance in italics)	• Perform mental calculations, including with mixed operations and large numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations • Solve addition and subtraction multi-step problems in context s, deciding which operations and methods to use and why • Solve problems using all four operations • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • *Pupils practise addition for larger numbers, using the formal written method of columnar addition* • *Pupils rounds answers to a specified degree of accuracy, e.g. to the nearest 10, 20. 50 etc. but not to a specified number of significant figures* • *Pupils explore the order of operations using brackets*
Representations to support mental and written calculations	 104,328 + 61,731 = 166,059  **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition 3.65 + 2.41 = 6.06    

	
Stem sentences	…. is ….more than …. You need … more to make …. There are …. and ….. We can write this as …. plus …. The ….. represents the …. ….. is equal to …. plus …. ….. plus …. Is equal to …. …. and …. are addends. …. is the sum If the column sum is equal to 10 or more, we must regroup. If the column sum is equal to 100 or more, we must regroup.
Teaching guidance	• addend + addend = sum • Encourage children to use formal column method when calculating, alongside concrete and pictorial representations • Place value counters or plain counters on a place value grid are the most effective concrete resources when adding numbers with more than 4 digits or when adding decimals with 1,2 and then 3 decimal places • Ensure children have experience of adding decimals with a variety of decimal places. This includes putting this into context when adding money and other measures • Ensure calculations are written alongside any manipulatives to make links • Ensure that when using column method, you state '*three hundred thousand add seven hundred thousand*', not '3 add 7', which equals '*ten hundred thousand or one million*' to preserve place value understanding. • Ensure when adding decimals, you state '6 tenths add 7 tenths' to reinforce place value • Empty decimal places can be filled with a zero to converse place value in the column • Ensure that children position the digits correctly in columns to preserve place value. • The decimal point should be aligned in the same way as the other place value columns, and must be the in the same column as the answer • At this stage, children should be encouraged to work in the abstract, using the column method to add larger numbers efficiently
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Read, write and order numbers up to 10000 and determine the value of each digit • Round any whole number to a required degree of accuracy • Use negative numbers in context and calculate intervals across zero • Solve number and practical problems that involve all of the above • Solve problems which require answers to be rounded to specific degrees of accuracy • *Pupils practise addition for larger numbers, using the formal written method of columnar addition*

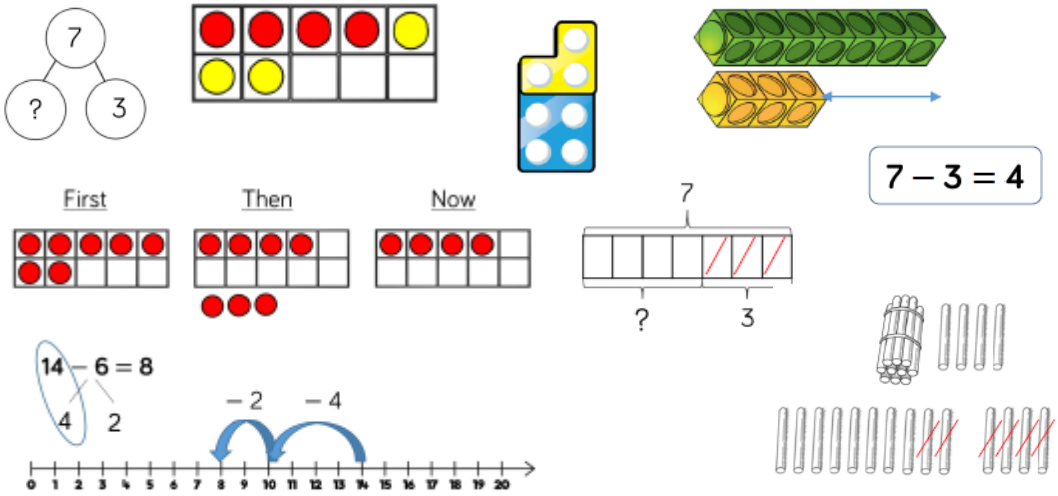
	• *Pupils round answers to a specified degree of accuracy. E.g to the nearest 20, 50 etc but not to a specified number of significant figures* • Add and subtract fractions with different denominators and mixed numbers • *Practise, use and understand the addition of fractions with different denominators by identifying equivalent fractions with the same denominator* • Use simple algebra formulae and equations using symbols and letters • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit and vice versa, using decimal notation to up to three decimal places • Recognise that shapes with the same areas can have different perimeters and vice versa • *Using the number line, pupils add positive and negative integers for measures* • Find unknown angles in any triangles, quadrilaterals, and regular polygons • Calculate and interpret the mean as an average

EYFS Subtraction

Key Language	take away, one less, two les, ten less…, fewer, difference, difference between, minus, subtract, left, less than, fewer, smaller, fewest, smallest, least, decrease, part, whole
Early Learning Goals (all Mathematics)	**Number** • Have a deep understanding of number to 10, including the composition of each number • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **Numerical Patterns** • Verbally count beyond 20, recognising the pattern of the counting system • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally
Representations to support mental and written calculations	
Stem sentences	…..are left ……have gone …is…fewer than… …is …less than …. First…then…now ….minus….equals …. Count back… from …. The difference between .. and … is … ……are left over …..more to make….
Teaching guidance	• Conservation (of number) – the concept that the number stays the same if none have been added or taken away • Counting back – children may find this harder because of the demands on working memory • Compare groups of objects – which groups have fewer/more – note that this is the number of objects, not the size of the objects • Reason about why some groups are unequal using more/less

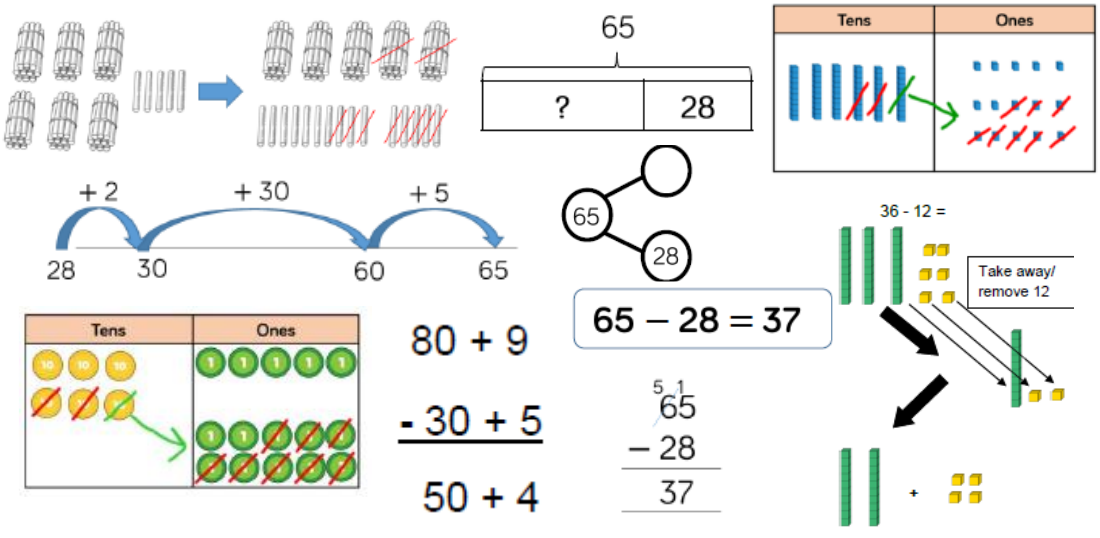
	• Converting unequal groups to equal by taking some from one group • Compare numbers that are far apart, near to and next to each other on a number line • Knowing the one more/one less relationship between counting numbers e.g. relabel a box that contains 5 with the digit 4 • Making predictions about what will happen in stories/songs if one is taken away • Part-whole – identifying smaller numbers within a number • Inverse operations e.g. Five Currant Buns – the whole is still 5 but some are in the shop and some have been taken away • Partitioning a number into different pairs/more than one number e.g. 10 is 3,6 and 1 • Hiding objects to partition the numbers in part-whole models • Recognising attributes in measures e.g. smaller, shorter, lighter, not enough • Comparing e.g. packing a shopping bag with lighter items at the top • Experiencing specific time durations e.g. count down timer
Early Years Framework Guidance (all Mathematics)	• Count confidently to 10 • Develop a deep understanding of numbers to 10, the relationships between those numbers and the relationships within those numbers • Children should use manipulatives to develop a secure base of knowledge and vocabulary • Children develop their spatial reasoning skills • Children look for patterns and relationships and spot connections

Year 1 Subtraction

Key Language	minus, subtract, take away, left, less than, difference, fewer, decrease, part, whole, equal to, partition, value, worth, ones, tens, minuend, subtrahend, half, halve, subtract, number bonds/pairs
Mental and written calculations	• Count to and across 100, backwards, beginning with 0 or 1, or from any given number • Given a number, identify one less • Identify and represent numbers using objects and pictorial representations including the number line, and use the language of equal to, less than (fewer), least • Read and interpret mathematical statements involving subtraction and equals signs • Represent and use number bonds and related subtraction facts within 20 • Subtract one-digit and two-digit numbers to 20, including 0 • Solve one-step and two-step problems that involve subtraction using concrete objects and pictorial representations and missing number problems such as 7 = ___ - 9 • *Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example 9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9). Thy should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.* • *They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms take away, distance between, difference between, less than, so that pupils develop the concept of subtraction and are enabled to use this operation flexibly.* **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition
Representations to support mental and written calculations	
Stem sentences	…..are left ……have gone …is…fewer than… ….is ….less than …. First…then…now ….minus….equals …. Count back… from ….

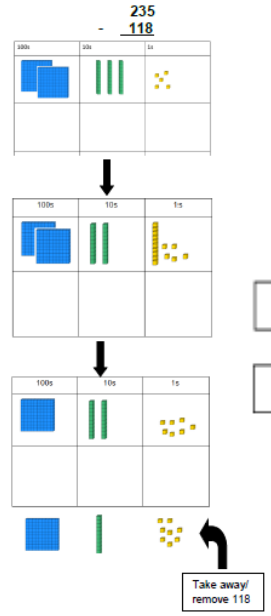
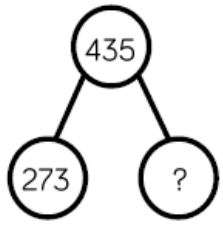
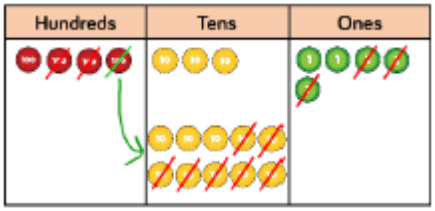
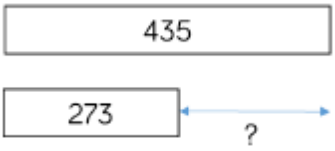
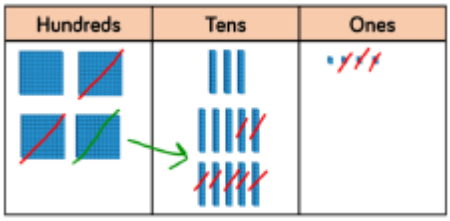
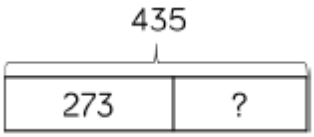
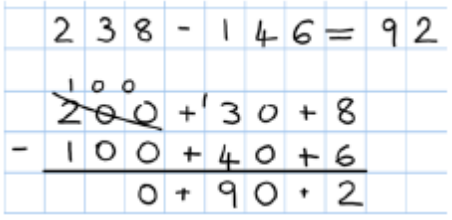
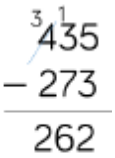
	The difference between .. and … is … I use my knowledge of number bonds to 10 to calculate 10 minus ….
Teaching guidance	• minuend – subtrahend = difference • Part-whole models, ten frames and number shapes support partitioning • Ten frames, number tracks, single bar models and bead strings support reduction • Cubes and bar models with two bars can support finding the difference • When subtracting one-digit numbers that cross 10, it is important to highlight the importance of ten ones equalling one ten • Children should be encouraged to find the number bond to 10 when partitioning the subtracted number. Ten frames, number shapes and number lines are particularly useful for this.
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• *Problems should include the terms distance between, difference between* • Compare, describe and solve practical problems for lengths and heights, mass/weight, capacity and volume, time • Sequence events in chronological order using language, for example before, yesterday

Year 2 Subtraction

Key Language	minus, subtract, take away, left, less, less than, least, difference, fewer, decrease, part, whole, equal to, partition, column, value, worth, ones, tens, hundreds minuend, subtrahend, half, halve, subtract, number bonds/pairs count back, count backwards, less than, tens boundary, ten less
NC Mental and written calculations	• Count in steps of 2, 3 and 5 from 0and in tens from any number backward • Recall and use subtraction facts to 20 fluently, and derive and use repeated facts up to 100 • Solve problems with subtraction using concrete objects, pictorial representations, and mentally, including a two-digit number and ones, a two-digit number and tens, two two-digit numbers, three one-digit numbers • Show that subtraction cannot be done in any order • Recognise and use the inverse relationship between addition and subtraction and use this to check calculation and solve missing number problems • Extend their understanding of subtraction • to include difference • Practise subtraction up to 20 to become increasingly fluent in deriving facts such as 10 – 7 =3 and 7 = 10 -3 to calculate 100 – 70 = 30 and 70 = 100 – 30 • They can check their calculations by adding to check subtraction • Apply increasing knowledge of written methods • Recording subtraction in columns supports place value and prepares for formal written methods with larger numbers **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition
Representations to support mental and written calculations	
Stem sentences	…..are left ……have gone …is…fewer than… How many fewer is…than….? How much less is….? First…then…now ….minus….equals …. Count back… from ….

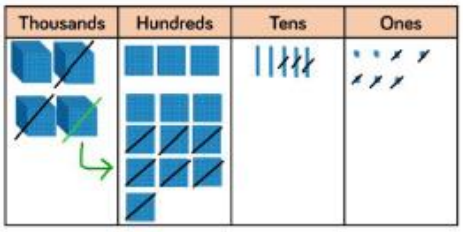
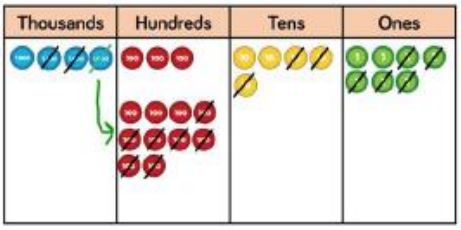
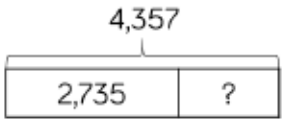
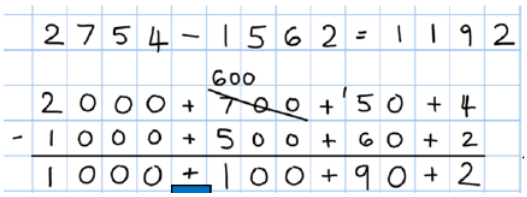
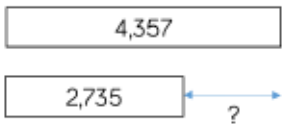
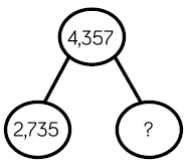
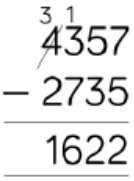
	The difference between .. and … is … I use my knowledge of number bonds to 10 to calculate 10 minus …. First I partition … Then ….minus … is equal to … First I subtract the tens….Then I subtract the ones….
Teaching guidance	• minuend – subtrahend = difference • Introduce examples where there is no exchanging first • Introduce 'exchanging' through practical partitioning • When learning to subtract, explore partitioning in different ways • Children should be encouraged to find the number bond to 10 when partitioning the subtracted number. Ten frames, number shapes and number lines are particularly useful for this. • Once children are secure with subtraction, use an expanded method and then compact • Combine methods with use of a hundred square to reinforce number value and order • Encourage children to use the formal method when calculating alongside straws, Base 10 or place value counters. • Children can also use a blank number line to count on to find the difference. Encourage them to jump in multiples of 10 to become more efficient • On a number line, subtract the tens first, then the ones. • Combine methods with use of a hundred square to reinforce understanding number value and order • Many mental strategies are taught. Children are taught to recognise that when numbers are close together, it is more efficient to count on the difference. They need to be confident about the relationship between addition and subtraction. e.g. Start with the smaller number and count on to the largest. • Teaching children to bridge through ten can help them become more efficient
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• *Partition numbers in different ways (for example 23 = 20 + 3 and 23 = 10 + 13) to support subtraction* • Solve simple problems in a practical context involving subtraction of money of the same unit including giving change • Compare and sequence intervals of time

Year 3 Subtraction

Key Language	minus, subtract, take away, left, less, less than, least, difference, fewer, decrease, part, whole, equal to, partition, column, value, worth, ones, tens, hundreds minuend, subtrahend, half, halve, subtract, number bonds/pairs count back, count backwards, less than, tens boundary, ten less, hundreds boundary, one hundred less
NC requirements: Mental and written calculations (non-statutory guidance in italics)	• Subtract numbers mentally including, a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds • Estimate the answer to a calculation and use inverse operations to check answers • Subtract numbers up with up to three digits, using formal written methods of columnar subtraction • Solve problems, including missing number problems using more complex subtraction • *Pupils practise solving various subtraction questions* • *Practise using columnar subtraction with increasingly large numbers up to three digits to become fluent*
Representations to support mental and written calculations	      435 – 273 = 262 **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition  
Stem sentences	…..are left ……have gone …is…fewer than… How many fewer is…than….? How much less is….? First…then…now

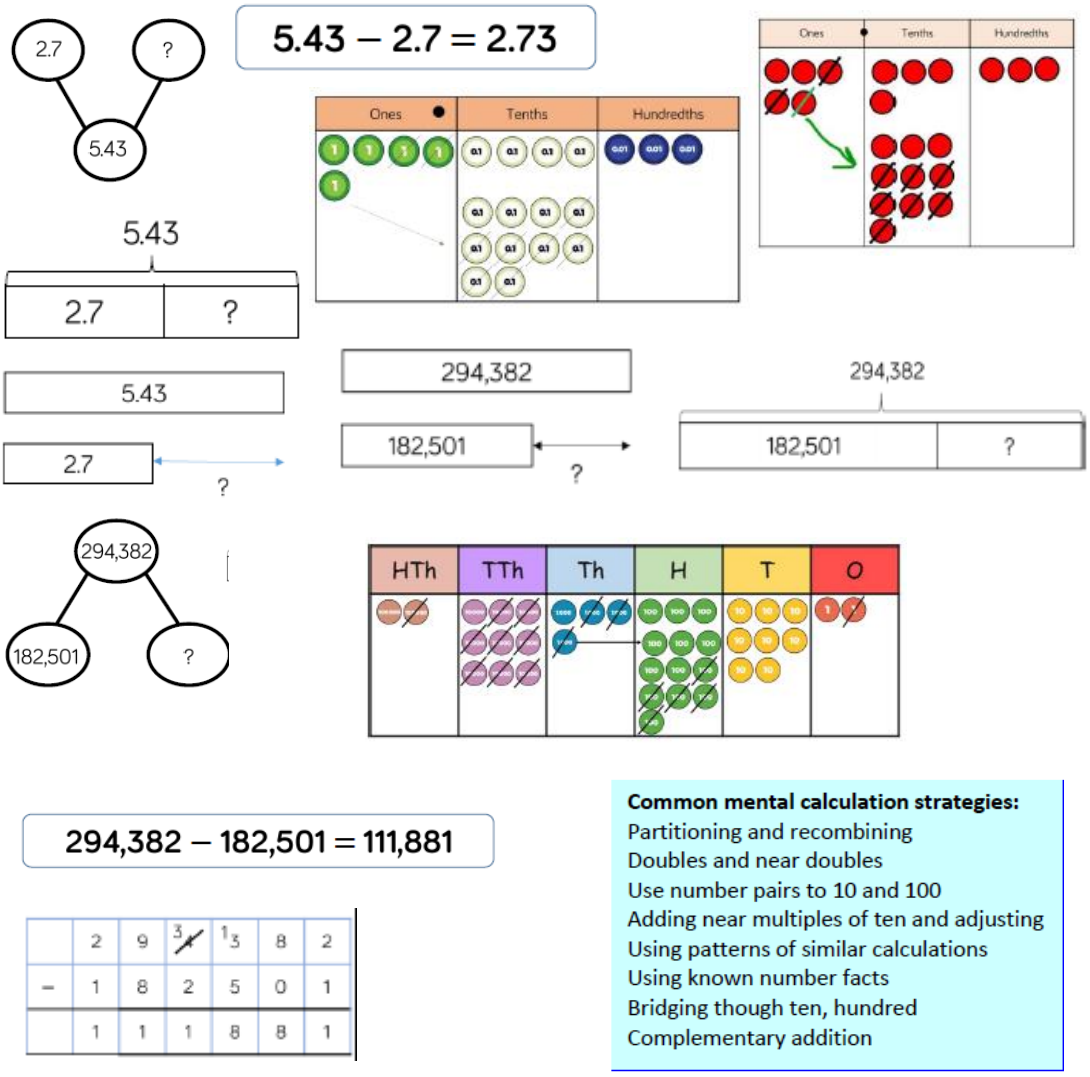
	….minus….equals …. Count back… from …. The difference between .. and … is … I use my knowledge of number bonds to 10 to calculate 10 minus …. First I partition … Then ….minus … is equal to … First I subtract the tens….Then I subtract the ones…. We line up the ones. .. ones minus…ones equals …ones We line up the tens. …tens minus ..tens equlas …tens We line up the hundreds ……hundreds minus … hundreds equals …hundreds …ones minus ….ones. We need to exchange 1 ten for 10 ones …tens minus…. Tens. We need to exchange one hundred for 10 tens.
Teaching guidance	• minuend – subtrahend = difference • Base 10 and place value counters are the most effective manipulative when subtracting numbers with up to 3 digits • Ensure that children write their calculation alongside and concrete resources so they can see the links to the written column method • Plain counters on a place value grid can also be used to support learning • Children should recap with expanded method then compact to build confidence • Introduce examples where no exchange is required then introduce exchanging through practical examples using Base 10. Once secure, they can then use the compact method with exchanging. • When exchanging, explore partitioning in different ways so that children understand that when you exchange the value is the same e.g. 72 = 70 + 2 = 60 + 12 = 50 + 22. Emphasise that the value hasn't changed, it is just partitioned in a different way
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Subtract fractions with the same denominator within one whole • Subtract lengths (m/cm/mm), mass (kg/g) and volume/capacity (l/ml) • Subtract amounts of money to give change using both £ and p in practical contexts • *Pupils continue to become fluent in recognising the value of coins by subtracting amounts, including mixed units, and giving change using manageable amounts* • Solve one-step and two-step questions e.g. How many fewer? Using information presented in scaled bar charts and pictograms and tables

Year 4 Subtraction

Key Language	minus, subtract, take away, left, less, less than, least, difference, fewer, decrease, part, whole, equal to, partition, column, value, worth, ones, tens, hundreds minuend, subtrahend, half, halve, subtract, number bonds/pairs count back, count backwards, less than, tens boundary, ten less, hundreds boundary, one hundred less, thousand, thousands boundary, one thousand less, above/below zero, negative numbers, inverse
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate • Estimate and use inverse operations to check answers to a calculation • Solve subtraction two-step problems in contexts, deciding which operations and methods to use and why
Representations to support mental and written calculations	       **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition
Stem sentences	…..are left ……have gone …is…fewer than… How many fewer is…than….? How much less is….? First…then…now ….minus….equals …. Count back… from …. The difference between .. and … is … I use my knowledge of number bonds to 10 to calculate 10 minus …. First I partition … Then ….minus … is equal to … First I subtract the tens….Then I subtract the ones…. We line up the ones. .. ones minus…ones equals …ones We line up the tens. …tens minus ..tens equals …tens We line up the hundreds ……hundreds minus … hundreds equals …hundreds

	…ones minus ….ones. We need to exchange 1 ten for 10 ones …tens minus…. Tens. We need to exchange one hundred for 10 tens.
Teaching guidance	• minuend – subtrahend = difference • Base 10 and place value counters are the most effective manipulatives when subtracting numbers with up to 4 digits • Ensure children write out their calculation alongside any concrete resources so they can see the links to the written column method • Plain counters on a place value grid can also be used to support learning • Recap with expanded method if necessary, then use compact method
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Find 1000 less than a given number • Count backwards through zero to include negative numbers • Round any number to the nearest 10, 100 or 1000 • Count down in hundredths • Subtract fractions with the same denominator • *Pupils continue to practise subtracting fractions with the same denominator to become fluent through a variety of increasingly complex problems beyond one whole* • *Practise counting backwards using simple fractions and decimals* • Estimate, calculate and compare different measures, including money in pounds and pence • Solve comparison difference problems using information presented in bar charts, pictograms, tables and other graphs

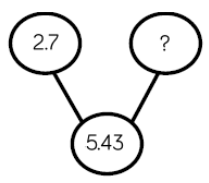
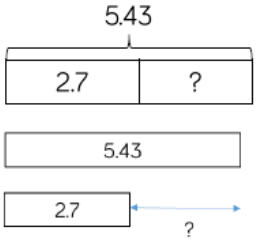
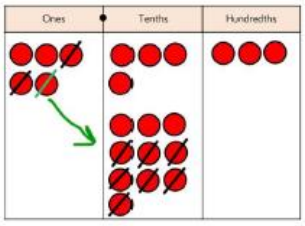
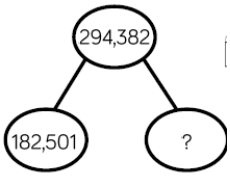
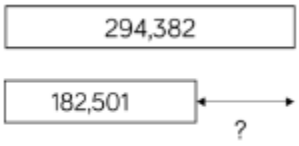
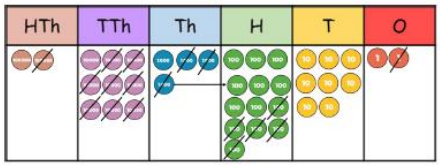
Year 5 Subtraction

Key Language	minus, subtract, take away, left, less, less than, least, difference, fewer, decrease, part, whole, equal to, partition, column, value, worth, ones, tens, hundreds minuend, subtrahend, half, halve, subtract, number bonds/pairs count back, count backwards, less than, tens boundary, ten less, hundreds boundary, one hundred less, thousand, thousands boundary, one thousand less, ten thousand, hundred thousand, million, above/below zero, negative numbers, inverse, less than or equal to, ones boundary, tenths boundary, hundredths, discount
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction) • Subtract numbers mentally with increasingly large numbers • Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • Solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why • *Pupils practise using the formal written method of columnar subtraction with increasingly large numbers to aid fluency* • *They practise mental calculations with increasingly large numbers to aid fluency 9for example 12462 – 2300 = 10162)*
Representations to support mental and written calculations	

Stem sentences	…..are left ……have gone …is…fewer than… How many fewer is…than….? How much less is….? First…then…now ….minus….equals …. Count back… from …. The difference between .. and … is … I use my knowledge of number bonds to 10 to calculate 10 minus …. First I partition … Then ….minus … is equal to … First I subtract the tens….Then I subtract the ones…. We line up the ones. .. ones minus…ones equals …ones We line up the tens. …tens minus ..tens equlas …tens We line up the hundreds ……hundreds minus … hundreds equals …hundreds …ones minus ….ones. We need to exchange 1 ten for 10 ones …tens minus…. Tens. We need to exchange one hundred for 10 tens.
Teaching guidance	• minuend – subtrahend = difference • Place value counters or plain counters on a place value gris are the most effective concrete resources when subtracting numbers with more than 4 digits or decimals with 1,2 then 3 decimal places. • At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently • Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Count backwards in steps of powers of 10, for any given number up to 1 000 000 • Count backwards with positive and negative whole numbers, including through zero • Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000, and 100 000 • Solve number problems and practical problems involving numbers to 1 000 000, decimal and negative numbers • *They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule* • *They should recognise and and describe linear number sequences (for example 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$…) including those involving fractions and decimals, and find the term-to-term rule in words) for example, add $\frac{1}{2}$)* • Solve problems using subtraction and the other operations, including understanding the meaning of the equals sign • Subtract fractions with the same denominator and denominators that are multiples of the same number • Round decimals with two decimal places to the nearest whole number and to one decimal place • Solve problems involving number up to three decimal places • *Pupils practise subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of subtracting fractions to calculations that exceed 1 as a mixed number* • *Pupils continue to practise counting backwards in simple fractions*

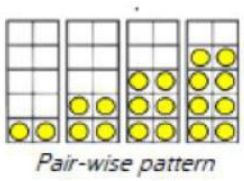
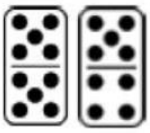
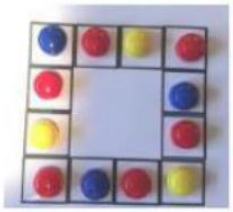
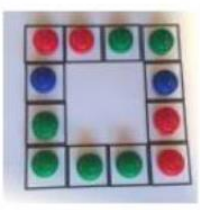
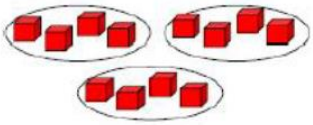
	• *Pupils extend counting from Year 4, using decimals and fractions including bridging zero, for example on a number line* • *They mentally add and subtract tenths, and one-digit whole numbers and tenths* • *They practise subtracting decimals, including a mix of whole numbers and decimals with different numbers of decimal places, and complements of 1 (e.g. 0.83 + 0.17 = 1)* • *Use subtraction to solve problems involving measure using decimal notation including scaling* • *Pupils calculate the perimeter of rectangles and related composite shapes. Missing measures can be expressed algebraically, e.g.4 + 2b = 20 for a rectangle of sides 2cm and b cm and a perimeter of 20cm* • *Pupils use subtraction in problems involving time and money* • Use the properties of rectangles to deduce related facts and find missing lengths and angles • Solve information presented in a line graph

Year 6 Subtraction

Key Language	minus, subtract, take away, left, less, less than, least, difference, fewer, decrease, part, whole, equal to, partition, column, value, worth, ones, tens, hundreds minuend, subtrahend, half, halve, subtract, number bonds/pairs count back, count backwards, less than, tens boundary, ten less, hundreds boundary, one hundred less, thousand, thousands boundary, one thousand less, ten thousand, hundred thousand, million, above/below zero, negative numbers, inverse, less than or equal to, ones boundary, tenths boundary, hundredths, discount, formulae, equation
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Perform mental calculations, including with mixed operations and large numbers • Use their knowledge of the order of operations to carry out calculations involving the four operations • Sole addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • *Pupils practise subtraction for larger numbers, using the formal written method of columnar subtraction* • *Pupils round answers to a specified degree of accuracy e.g. to the nearest 10, 20, 50 etc. but not to a specified number of significant figures* • *Pupils explore the order of operations using brackets*
Representations to support mental and written calculations	      294,382 − 182,501 = 111,881  **Common mental calculation strategies:** Partitioning and recombining Doubles and near doubles Use number pairs to 10 and 100 Adding near multiples of ten and adjusting Using patterns of similar calculations Using known number facts Bridging though ten, hundred Complementary addition
Stem sentences	…..are left ……have gone …is…fewer than… How many fewer is…than….? How much less is….? First…then…now ….minus….equals …. Count back… from …. The difference between .. and … is …

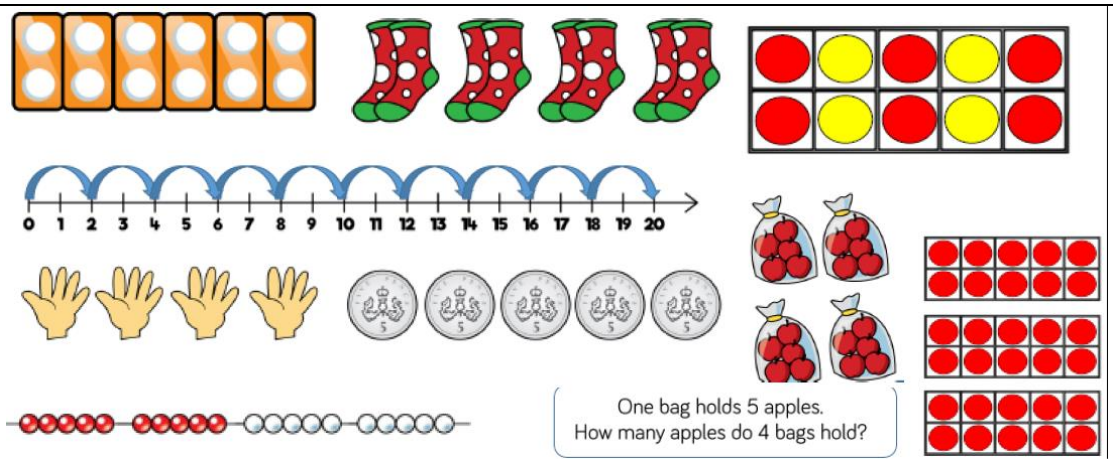
	I use my knowledge of number bonds to 10 to calculate 10 minus …. First I partition … Then ….minus … is equal to … First I subtract the tens….Then I subtract the ones…. We line up the ones. .. ones minus…ones equals …ones We line up the tens. …tens minus ..tens equlas …tens We line up the hundreds ……hundreds minus … hundreds equals …hundreds …ones minus ….ones. We need to exchange 1 ten for 10 ones …tens minus…. Tens. We need to exchange one hundred for 10 tens.
Teaching guidance	• minuend – subtrahend = difference • Place value counters or plain counters on a place value grids are the most effective concrete resources when subtracting numbers with more than 4 digits or decimals with 1,2 then 3 decimal places. • At this stage, children should be encouraged to work in the abstract, using column method to subtract larger numbers efficiently • Ensure children have experience of subtracting decimals with a variety of decimal places. This includes putting this into context when subtracting money and other measures • Use a place holder zero in any empty decimal places to aid understanding of what to subtract in that column
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Read, write and order numbers up to 10000 and determine the value of each digit • Round any number to a required degree of accuracy • Use negative numbers in context and calculate intervals across zero • Solve number and practical problems involving numbers up to 10 000 000 and negative numbers • Add and subtract fractions with different denominators and mixed numbers • Solve problems which require answers to be rounded to specific degrees of accuracy • *Practise, use and understand the subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator* • Use simple algebra formulae and equations using symbols and letters • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places • Recognise that shapes with the same areas can have different perimeters and vice versa • *Using the number line, pupils subtract positive and negative integers for measures such as temperature* • Find unknown angles in any triangles, quadrilaterals and regular polygons • Calculate and interpret the mean as an average

EYFS Multiplication

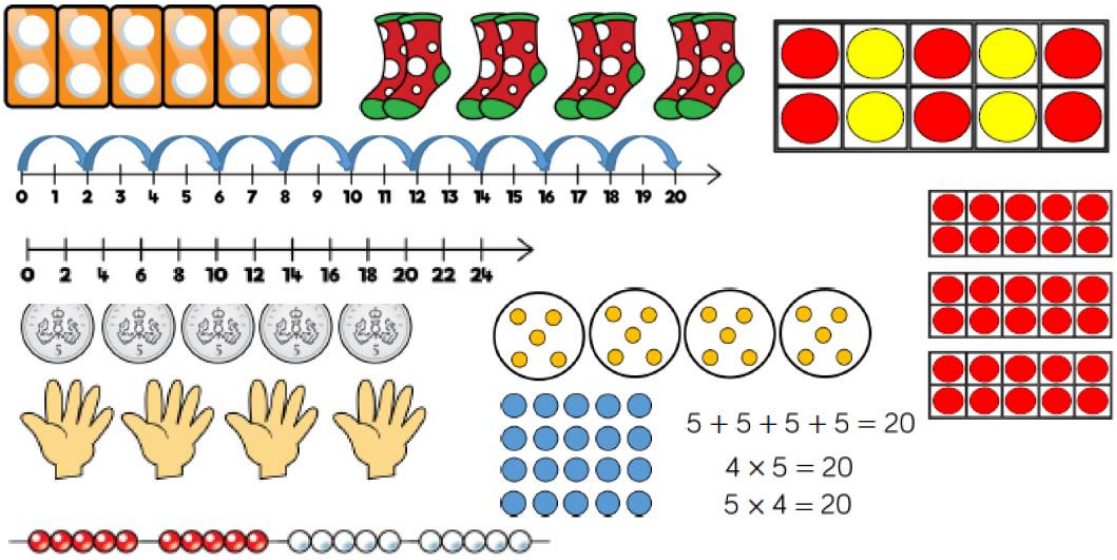
Key Language	sharing, doubling, halving, number patterns, parts of a whole, partition, half, quarter, odd, even
Early Learning Goals (all Mathematics)	**Number** • Have a deep understanding of number to 10, including the composition of each number • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **Numerical Patterns** • Verbally count beyond 20, recognising the pattern of the counting system • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally
Representations to support mental and written calculations	        
Stem sentences	This is a red blue pattern. I call it an A (one of these) then a B (one of those) First _____, then _____, next _____ I can continue this pattern with _____
Teaching guidance	• Children will learn that double means 'twice as many' • Building doubles using real objects and mathematical equipment e.g. dominoes, dice, Numicon • Mirrors are good ways for children to see doubles and explore early symmetry • Encourage the children to say the doubles as they build them • Provide examples of doubles and non-doubles for the children to sort and explain why • Focus on repeating patterns – AB, ABC, ABB, ABBC • With patterns, children should: continue, copy, make their own, spot errors in a pattern, identify the unit of repeat, continue patterns that end mid-unit • As children become more confident, they can record their patterns. at first, they will be actual representations, but eventually they will become more iconic e.g. red dot for dinosaur or 'R'

	• Encourage children to symbolise patterns in different ways – they pick up on the coding AB, ABC, ABB, ABBC • Encourage children to explain the 'rules' of their patterns to friends and that they can follow their own code • Progress to making patterns in circles e.g. on plates, necklaces • Encourage children to predict if their pattern could keep going • Explore patterns in fabric, wallpaper, wrapping paper • Consider extending patterns, e.g. in cross shape, staircase patterns going up in ones or twos • Children may spot spatial patterns e.g. reflecting patterns or in stories
Early Years Framework Guidance (all Mathematics)	• Count confidently to 10 • Develop a deep understanding of numbers to 10, the relationships between those numbers and the relationships within those numbers • Children should manipulatives to develop a secure base of knowledge and vocabulary • Children develop their spatial reasoning skills • Children look for patterns and relationships and spot connections

Year 1 Multiplication

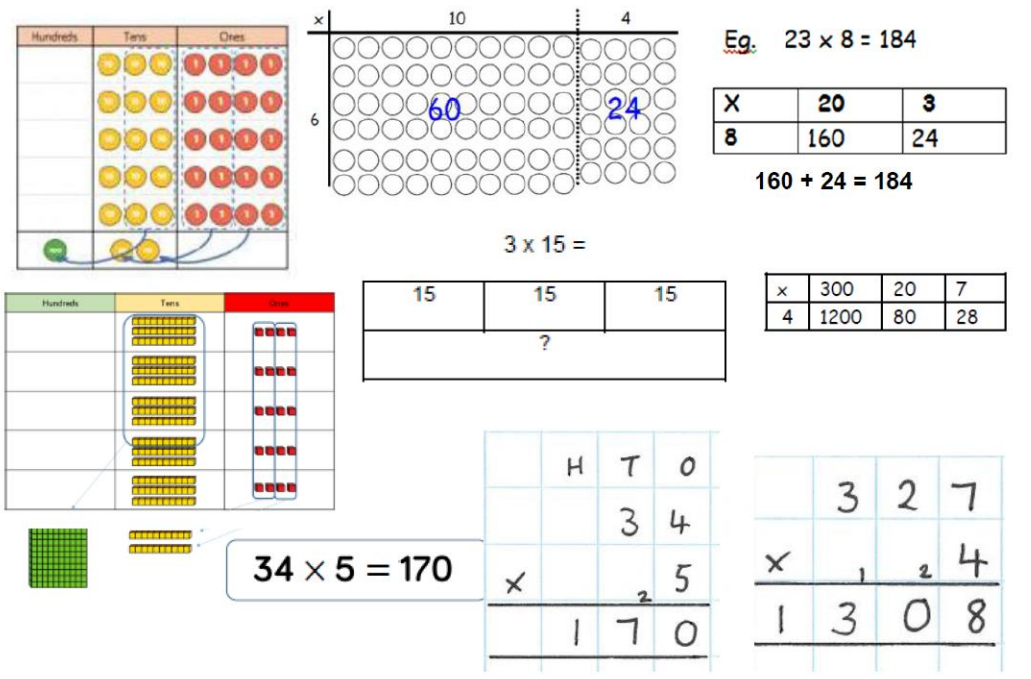
Key Language	groups of, lots of, times, array, altogether, multiply, count, sharing, doubling, halving, number patterns, parts of a whole, partition, half, quarter, odd, even
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Count in multiples of twos, fives and tens • Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
Representations to support mental and written calculations	
Stem sentences	There are ____ equal groups There are ____ in each group There are _____ equal groups of _____
Teaching guidance	• factor x factor = product • Children represent multiplication as repeated addition in many different ways • Children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• *Counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system* • *Through grouping and sharing small quantities, pupils begin to understand multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities* • *They make connections between arrays, number patterns, and counting in twos, fives and tens*

Year 2 Multiplication

Key Language	groups of, lots of, times, array, altogether, multiply, count, sharing, doubling, halving, multiplied by, repeated addition, column, row, commutative, sets of, groups, times as big as, once, twice, three times, factor, product
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Count in steps of 2,3 and 5 from 0, and in tens from any number forwards and backward • Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (x) and equals (=) signs • Show that multiplication of two numbers can be done in any order (commutative) • Solve problems using multiplication using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in context
Representations to support mental and written calculations	
Stem sentences	There are _____ equal groups There are _____ in each group There are _____ equal groups of _____ If there are _____ equal groups, we can use the _____ times table I can see 3 groups of 5 and I can see 5 groups of 3 3 times 5 can represent 3 groups of 5. It can also represent 3 times 5
Teaching guidance	• factor x factor = product • Encourage daily counting in multiples both forwards and backwards • Use a number line or hundred square to support counting in multiples alongside concrete manipulatives • Look for patterns in the two times table, noticing even numbers and the pattern in the ones • Children are introduced to the multiplication symbol • Use arrays to teach children to understand the commutative law of multiplication, and give examples such as 3 x __- = 6

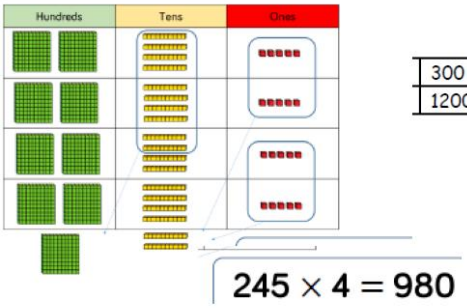
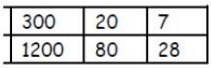
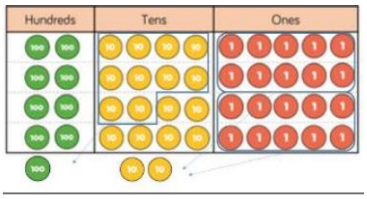
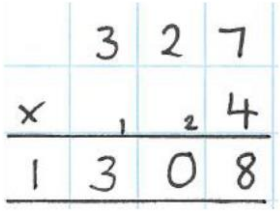
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• *They count in multiples of three to support their later understanding of a third* • *Pupils use a variety of language to describe multiplication* • *Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts to perform written and mental calculations.* • *Pupils work with a range of materials and contexts in which division relates to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example 40 ÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example 4 x 5 = 20 and 20 ÷ 5 = 4)* • *Comparing measures includes simple multiples such as 'twice as wide'*

Year 3 Multiplication

Key Language	groups of, lots of, times, array, altogether, multiply, count, sharing, doubling, halving, multiplied by, repeated addition, column, row, commutative, sets of, groups, times as big as, once, twice, three times, factor, product, partition, grid method, multiple, tens, ones, value, double, scaling
National curriculum: Mental and written calculations (Non-statutory guidance in italics)	• Recall and use multiplication facts for the 3, 4 and 8 multiplication tables • Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including two-digit numbers times on-digit numbers using mental and progressing to formal written methods • Solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects • *Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Trough doubling, they connect the 2, 4 and 8 multiplication tables* • *Pupils develop efficient mental methods, for example using commutativity and associativity (for example 4 x 12x 5 = 4 x 5 x 12 = 20 x 12 = 240) and multiplication facts (for example, using 3 x 2 = 6) to derive related facts (for example 30 x 2 = 60)* • *Pupils develop reliable written methods for multiplication, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written method of short multiplication* • *Pupils solve simple problems in contexts. These include measuring and scaling contexts, (for example four times as high, eight times as long etc) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?)*
Representations to support mental and written calculations	

Stem sentences	There are _____ equal groups There are _____ in each group There are _____ equal groups of _____ If there are _____ equal groups, we can use the __ times table I can see 3 groups of 5 and I can see 5 groups of 3 3 times 5 can represent 3 groups of 5. It can also represent 3 times 5 15 is equal to 10 plus 5. So 3 times 15 is equal to 3 times 10 plus 3 times 5 ___ multiplied by 10 is equal to ____ ____ is ten times the size of ____ First we multiply the ones, then we multiply the tens. We add those products together If there are ten or more ones, then we must regroup the ones into 10s and 1s
Teaching guidance	• factor x factor = product • Use the expanded column method first before moving onto the short multiplication method • Place value counters can be used to support the method rather than for calculating • Introduce the grid method with children making an array to represent the calculation then translate this to the grid method format • Children can move onto the short method if confident • Partition numbers into tens and ones and multiply multiples of ten by a single digit (eg 20 x 4) using their knowledge of multiplication facts and place value
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• *The comparison of measures includes simple scaling by integers (for example a given quantity or measure is twice as long or fives times as high) and this connects to multiplication.* • *Pupils understand and use simple scales (for example, 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy.*

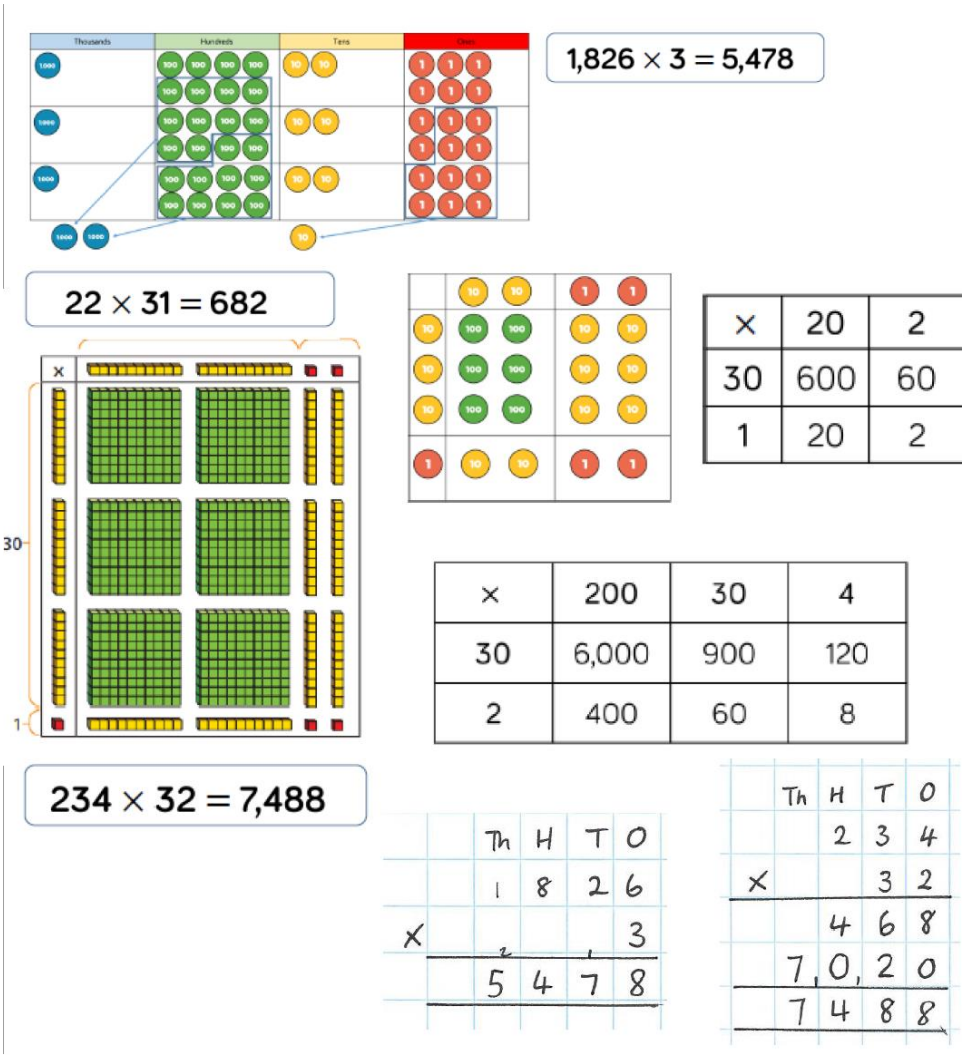
Year 4 Multiplication

Key Language	groups of, lots of, times, array, altogether, multiply, count, sharing, doubling, halving, multiplied by, repeated addition, column, row, commutative, sets of, groups, times as big as, once, twice, three times, factor, product, partition, grid method, multiple, tens, ones, value, scaling, short method, inverse
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Recall multiplication facts for multiplication tables up to 12 x 12 • Use place value, known and derived facts to multiply mentally, including multiplying by 0 and 1, and multiplying together three numbers • Recognise and use factor pairs and commutativity in mental calculations • Multiply two-digit and three-digit numbers by a one-digit number using formal written layout • Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects • *Pupils continue to practise recalling and using multiplication tables to aid fluency* • *Pupils practise mental methods and extend this to three-digit numbers to derive facts* • *Pupils practise to become fluent in the formal written method of short multiplication with exact answers* • *Pupils write statements about the equality of expressions (for example use the distributive law 39 x 7 = 30 x 7 x+ 9 x 7 and associative law (2 x 3) x 4 = 2 x (3 x 4). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations, for example 2 x 6 x 5 = 10 x 6 = 60.* • *Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of meal on a menu.*
Representations to support mental and written calculations	   
Stem sentences	There are ____ equal groups. There are ____ in each group. There are ____ equal groups of ____. If there are _____ equal groups, we can use the ____ times table. I can see 3 groups of 5 and 5 groups of 3. 3 times 5 can represent 3 groups of 5. It can also represent 3 times 5. 15 is equal to 10 plus 5. So 3 times 15 is equal to 3 times 10 plus 3 times 5 ___ multiplied by 10/100 is equal to _____.

	_____ is ten/one hundred times the size of _____. First we multiply the ones and then we multiply the tens. We add those products together. If there are 10 or more ones, we must regroup the ones into 10s and 1s If there are 10 or more tens, we must regroup the tens into 100s and 10s
Teaching guidance	• factor x factor = product • When moving to 3-digit x 1-digit multiplication, encourage children to move towards the short formal written method. • Base 10 and place value counters a=can still be used to support • Limit the number of exchanges needed in the questions and move the children away from resources when multiplying larger numbers • Remind the children to estimate before they calculate • Encourage the children to preserve place value using column addition • Use a grid method to compare with the compact method at first
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Count in multiples of 6, 7, 25 and 100 • *Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths* • Convert between different units of measure (for example kilometres to metres, hour to minute) • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days. • *They use multiplication to convert from larger to smaller units.* • *They relate area to arrays and multiplication.*

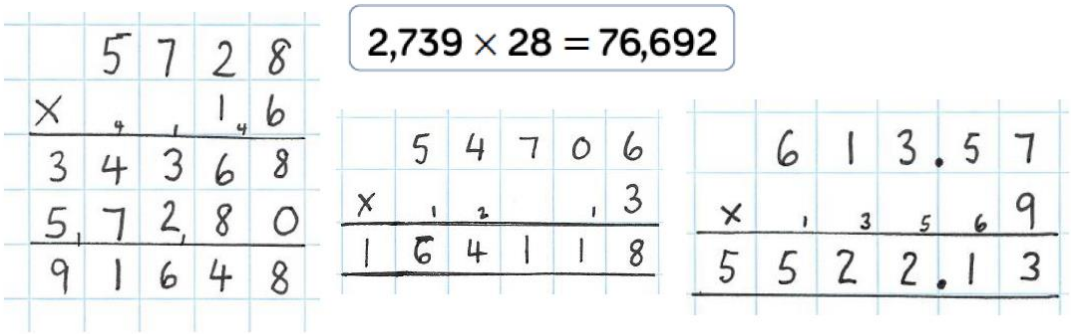
Year 5 Multiplication

Key Language	groups of, lots of, times, array, altogether, multiply, count, sharing, doubling, halving, multiplied by, repeated addition, column, row, commutative, sets of, groups, times as big as, once, twice, three times, factor, product, partition, grid method, multiple, tens, ones, value, scaling, short method, inverse, square, prime, integer, decimal
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • Know and use vocabulary of prime numbers, prime factors and composite (non-prime) numbers • Establish whether a number up to 100 is prime and recall prime numbers up to 19 • Multiply numbers up to four-digits by a one- or two- digit number using a formal written method, including long multiplication for two-digit numbers • Multiply numbers mentally drawing upon known facts • Multiply whole numbers and those involving decimals by 10, 100 and 1000 • Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}). • Solve problems involving multiplication including using their knowledge of factors and multiples, squares and cubes • Solve problems involving multiplication, including scaling by simple fractions and problems involving simple rates • *Pupils practise and extend their use of the formal written methods of short multiplication. They apply all the multiplication tables, commit them to memory and use them confidently to make larger calculations* • *Pupils use multiplication and division as inverses to support the introduction of ratio in Year 6, for example, by multiplying and dividing powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres* • *Distributivity can be expressed as a(b+c) = ab + ac* • *They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 =* 9^2*x 10)* • Pupils use and explain the equals sign to indicate equivalence, including in missing number problems

Representations to support mental and written calculations	
Stem sentences	There are ____ equal groups. There are ____ in each group. There are ____ equal groups of ____. If there are _____ equal groups, we can use the ____ times table. I can see 3 groups of 5 and 5 groups of 3. 3 times 5 can represent 3 groups of 5. It can also represent 3 times 5. 15 is equal to 10 plus 5. So 3 times 15 is equal to 3 times 10 plus 3 times 5 ___ multiplied by 10/100 is equal to _____. _____ is ten/one hundred times the size of _____. First we multiply the ones and then we multiply the tens. We add those products together. If there are 10 or more ones, we must regroup the ones into 10s and 1s If there are 10 or more tens, we must regroup the tens into 100s and 10s If there are 10 or more hundreds, we must regroup the hundreds into 100s and 100s
Teaching guidance	• factor x factor = product • When multiplying 4-digit numbers, place value counters are the best manipulatives to use to support children in their understanding • If children are struggling with their tables, encourage the use of multiplication grids or lists so children can focus on the written method • When multiplying a multidigit number by 2-digits. Use the area model to help children understand the size of the numbers they are using. This links to finding the area of a rectangle by finding the space covered by the Base 10. • The grid method matches the area model as an initial written method before moving on to the formal written method

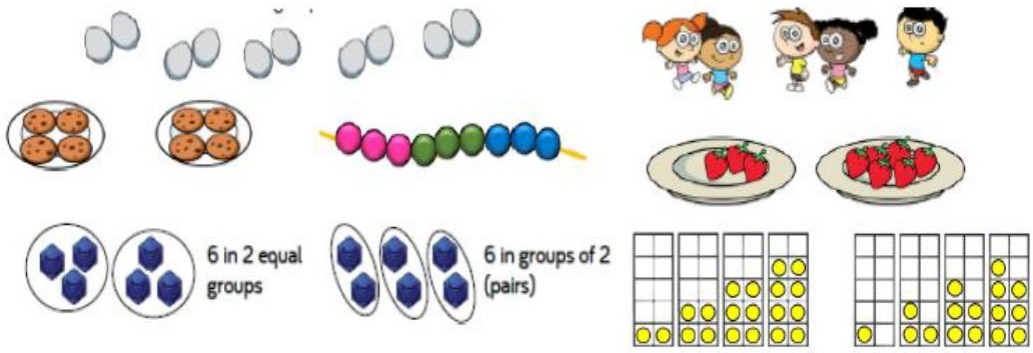
	• Always preserve place value when calculating e.g. 32 x 4 we are multiplying by 30 (not 3)
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Compare and order fractions whose denominators are all multiples of the same number • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams • *Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by fractions, including >1* • Convert between different units of metric measure (for example kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • Calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes • Estimate volume[for example using 1cm^2 blocks to build cuboids (including cubes)] and capacity [for example using water] • Solve problems converting units of time • Use multiplication to solve problems involving measure [for example length, mass, volume, money] using decimal notation, including scaling • *Pupils calculate the perimeter of rectangles and related composite shapes. Missing measures can be expressed algebraically, e.g. 4 + 2b = 20 for a rectangle of sides 2cm and b cm and a perimeter of 20cm* • *Pupils calculate the area from scale drawings using given measurements* • *Pupils use multiplication in problems involving time and money, including conversions (for example days to weeks, expressing the answers as weeks and days)*

Year 6 Multiplication

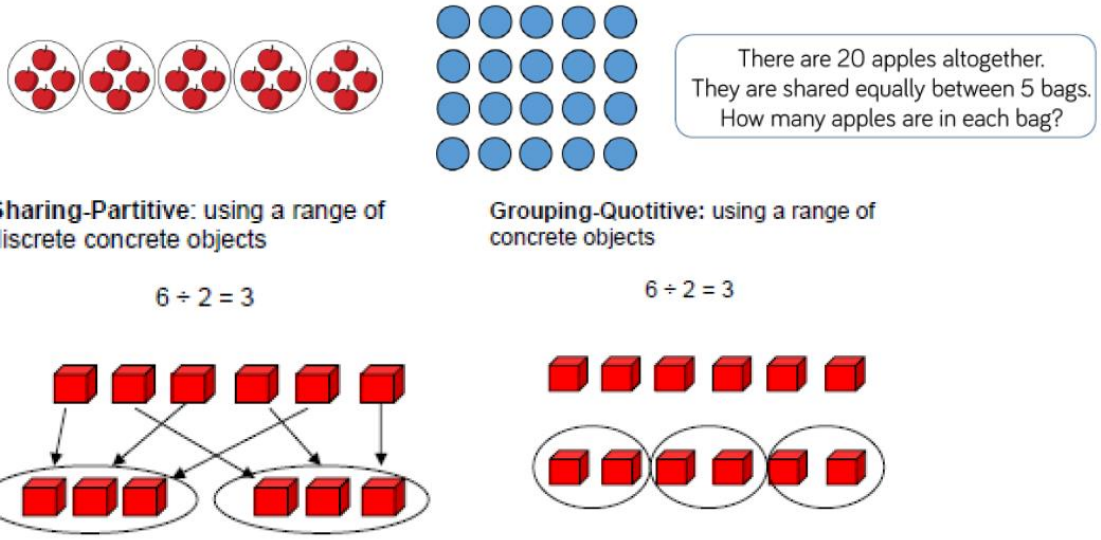
Key Language	groups of, lots of, times, array, altogether, multiply, count, sharing, doubling, halving, multiplied by, repeated addition, column, row, commutative, sets of, groups, times as big as, once, twice, three times, factor, product, partition, grid method, multiple, tens, ones, value, scaling, short method, inverse, square, prime, integer, decimal
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Multiply multi-digit numbers up to 4-digits by a two-digit whole number using the formal written method of long multiplication • Perform mental calculations, including with mixed operations and large numbers • Identify common factors, common multiples and prime numbers • Use their knowledge of the order of operations to carry out calculations using the four operations • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • *Pupils practise multiplication for larger numbers using short and long multiplication* • *Pupils continue to use all multiplication tables to calculate mathematical statements in order to maintain their fluency* • *Pupils explore the order of operations using brackets* • *Common factors can be related to finding equivalent fractions*
Representations to support mental and written calculations	
Stem sentences	___ multiplied by 10/100 is equal to _____. _____ is ten/one hundred times the size of _____. To multiply a three-digit number by a two-digit number, first multiply by the ones, then the tens and then add them together. If there are 10 or more ones, we must regroup the ones into 10s and 1s If there are 10 or more tens, we must regroup the tens into 100s and 10s If there are 10 or more hundreds, we must regroup the hundreds into 100s and 100s
Teaching guidance	• factor x factor = product • When multiplying 4-digits by 2-digits, children should eb confident in the written method • If they are still struggling with times tables, provide multiplication grids or lists to support when they are focusing on the use of the method • Consider where exchanged digits are placed and make sure that this is consistent • When multiplying decimals. Line up the decimal points in the question and the answer. This works well for multiplying money and other measures. • The position of the subscript is flexible

Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Solve number and practical problems that involve numbers up to 10 000 000 and negative numbers • Use common multiples to express fractions in the same denomination • Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example $\frac{1}{4}$ x $\frac{1}{2}$ = $\frac{1}{8}$] • Multiply numbers by 10, 100 and 1000 giving answers to three decimal places • Multiply one-digit numbers with up to two decimal places by whole numbers • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts • *Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects., for example as parts of a rectangle.* • *Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity [for example if $\frac{1}{4}$ of a length is 36cm, then the whole length is 36cm x 4 = 144cm]* • *Pupils multiply numbers with up to two decimal places by one-digit and two-digit whole number. Pupils multiply decimals by whole numbers starting with the simplest cases, such as 0.4 x 2 = 0.8, and in practical contexts such as money and measures.* • Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • *Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation a:b to record their work* • *Pupils solve problems using unequal quantities; for example, 'for every egg, you need three spoonful of flour.* • Use simple formulae and express missing number problems algebraically using symbols and letters • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit and vice versa, using decimal notation to up to three decimal places • Convert between miles and kilometres • Recognise that shapes with the same areas can have different perimeters and vice versa • Recognise when it is possible to use formulae for area or volume of shapes • Calculate the area of parallelograms and triangles • Calculate, estimate and compare volumes of cubes and cuboids using standard units including cubic centimetres (cm^3) and cubic metres (m^3) and extending to other units [for example mm^3 and km^3] • Know the diameter of a circle is twice the radius • *They should connect conversion from kilometres to miles in measurement to its graphical representation*

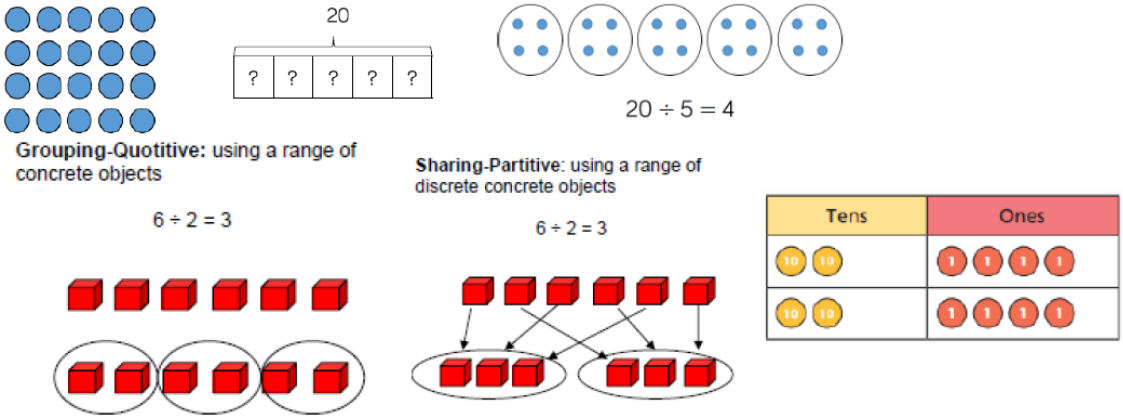
EYFS Division

Key Language	sharing, doubling, halving, number patterns, parts of a whole, partition, half, quarter, share equally, group, each, left over, odd, even
Early Learning Goals (all Mathematics)	**Number** • Have a deep understanding of number to 10, including the composition of each number • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **Numerical Patterns** • Verbally count beyond 20, recognising the pattern of the counting system • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantities • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally
Representations to support mental and written calculations	
Stem sentences	They are shared equally. Everyone has the same. Each ____ has ____. I can make _____ groups of 2. There are _____ left over. I can share _____ into _____ equal groups.
Teaching guidance	• During games or snack time, children can share things out equally • Children should get opportunities to share or group e.g. 3 crackers on a plate, 2 flowers into each pot • Encourage children to consider what to do with items left over • As children begin to understand that some quantities will share into two groups equally or grouped into pairs, encourage them to notice the odd and even structure by building pair-wise patterns on 10 frames • Children can compare odd and even numbers on a tens frame
Early Years Framework Guidance (all Mathematics	• Count confidently to 10 • Develop a deep understanding of numbers to 10, the relationship between those numbers and the relationships within those numbers • Children develop their spatial reasoning skills • Children look for patterns and relationships and spot connections

Year 1 Division

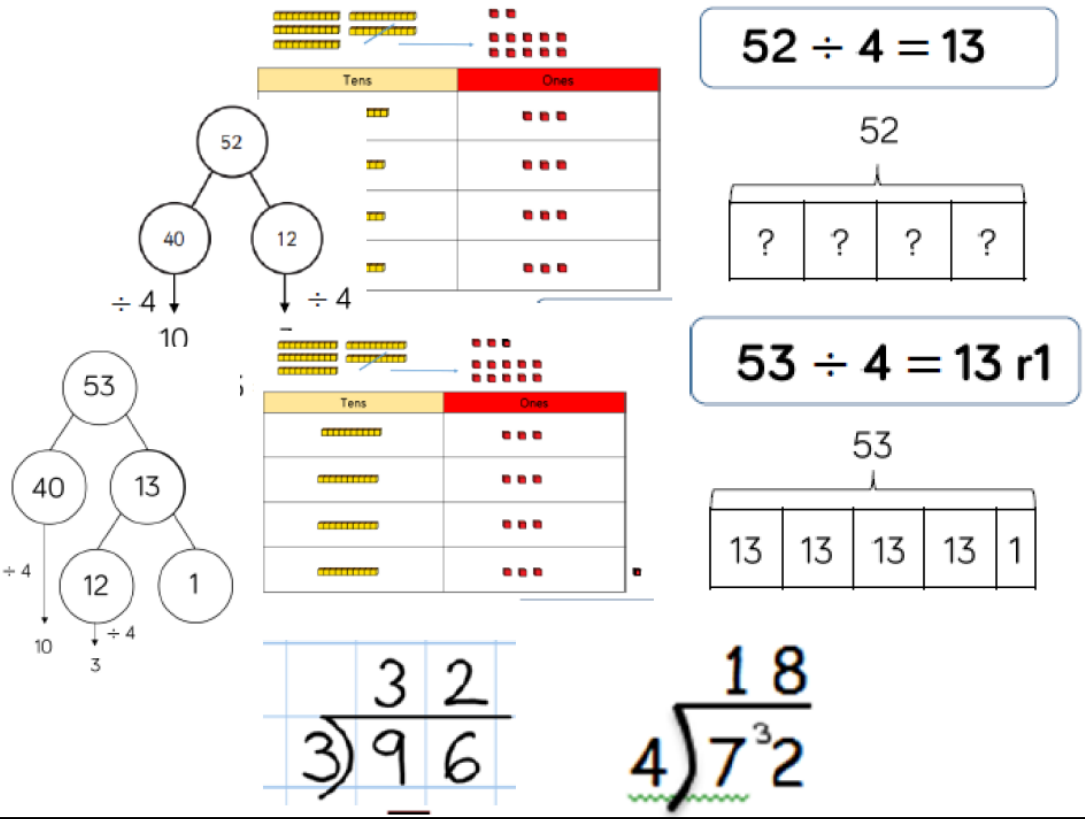
Key Language	sharing, doubling, halving, number patterns, parts of a whole, partition, half, quarter, share equally, group, each, left over, odd, even, dividend, divisor, quotient
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher • Recognise, find and name a half as one of two equal parts of an object, shape or quantity • Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity
Representations to support mental and written calculations	
Stem sentences	6 divided between 2 is equal to 3 each 6 shared into 2 equal groups – there are 3 in each group 6 is the dividend, 2 is the divisor, 3 is the quotient
Teaching guidance	• Dividend ÷ divisor = quotient • Children solve problems by sharing amounts into equal groups • Children solve problems by grouping and counting the number of groups • Grouping encourages children to count in multiples and links to repeated subtraction on a number line • Children should understand the difference between 'grouping' (how many groups of two can you make?) and 'sharing' (share these sweets between two people) • Children use concrete and pictorial representations to solve problems. They are not expected to record division formally
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• *Through grouping and sharing small quantities, pupils begin to understand multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities* • *Pupils are taught half and quarter as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. Pupils connect halves and quarters to the equal sharing and grouping of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole*

Year 2 Division

Key Language	sharing, doubling, halving, number patterns, parts of a whole, partition, half, quarter, share equally, group, each, left over, odd, even, dividend, divisor, quotient, one each, two each, group, groups of, lots of, array, divide, divided by, division, grouping, sharing, left over
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Count in steps of 2,3 and 5 from 0, and in tens from any number forwards and backward • Recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs • Show that division of one number by another number cannot be done in any order (not commutative) • Solve problems involving division using materials, arrays, repeated addition and subtraction, mental methods, and multiplication facts, including problems in context
Representations to support mental and written calculations	
Stem sentences	6 divided between 2 is equal to 3 each 6 shared into 2 equal groups – there are 3 in each group 6 is the dividend, 2 is the divisor, 3 is the quotient How many groups of ____ can you make? Share ____ between ____.
Teaching guidance	• Dividend ÷ divisor = quotient • Children solve problems by sharing amounts into equal groups • Children solve problems by grouping and counting the number of groups • Grouping encourages children to count in multiples and links to repeated subtraction on a number line • Understand the difference between 'grouping' (How many groups of two can you make?) and 'sharing' (Share these sweets between two people) • Use arrays to explain the link between multiplication and division • In Year 2, children are introduced to the division symbol
Links to other strands of Maths National Curriculum (including non-statutory	• *Pupils use a variety of language to describe division* • *They begin to use division facts related to times tables to perform written and mental calculations* • *Pupils work with a range of materials and contexts in which division relates to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for*

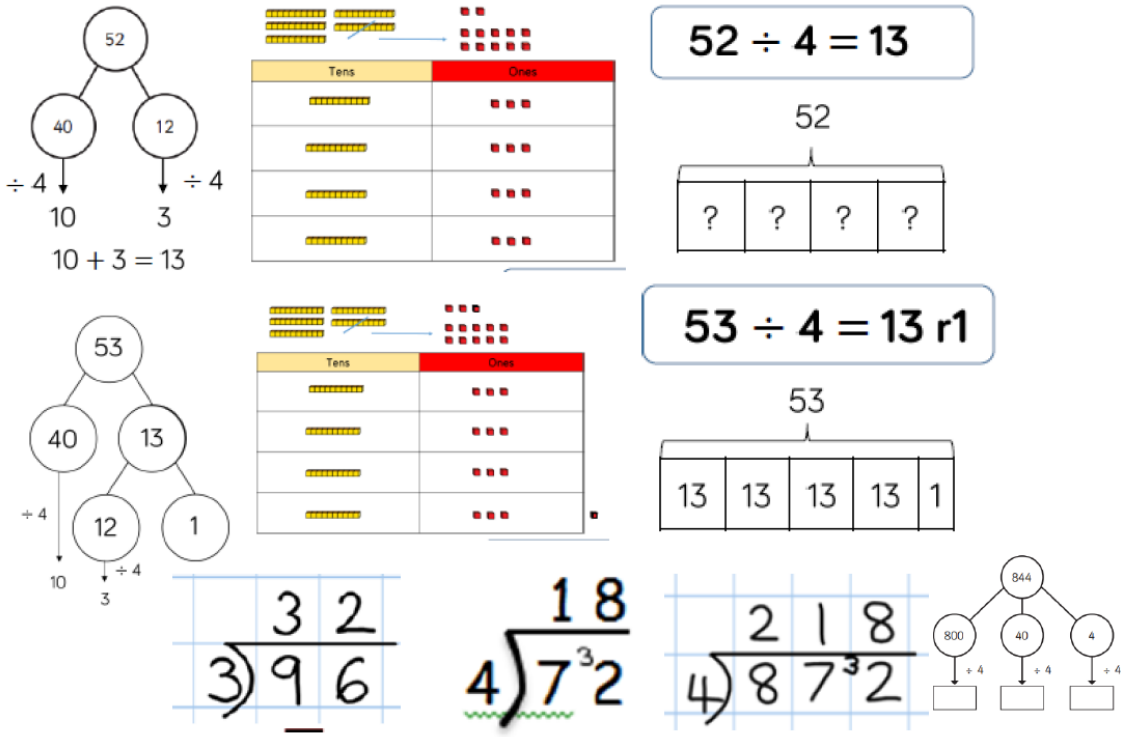
guidance in italics)	*example 40 ÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example 4 x 5 = 20 and 20 ÷ 5 = 4)* • Recognise, find, name and write fractions $\frac{1}{3}$ $\frac{1}{4}$ $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity • Write simple fractions for example $\frac{1}{2}$ of 6 = 3 • *Pupils use fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers, when they can be calculated, and to measures, finding fractions of lengths, quantities, seta of objects or shapes.* • *Comparing measures includes simple multiples such as 'half as high'*

Year 3 Division

Key Language	dividend, divisor, quotient, one each, two each, group, groups of, lots of, array, divide, divided by, division, grouping, sharing, remainder, inverse, short division, multiple
National Curriculum requirements (Non-statutory notes and guidance in italics)	• Recall and use division facts for the 3, 4 and 8 times tables • Write and calculate mathematical statements for division using the multiplication tables that they know, including two-digit numbers times on-digit numbers using mental and progressing to formal written method • Solve problems, including missing number problems, involving division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects • *Pupils develop efficient mental methods using division facts (for example, using 6 ÷ 3 = 2, 2 = 6 ÷ 3) to derive related facts (for example 60 ÷ 3 = 20 and 20 = 60 ÷ 3)* • *Pupils develop reliable written methods for division, progressing to the formal written method of short division* • *Pupils solve simple problems in contexts. These include measuring and scaling contexts and correspondence problems in which m objects are connected to n objects (for example 12 sweets shared equally between 4 children, 4 ckaes shared equally between 6 children)*
Representations to support mental and written calculations	
Stem sentences	6 divided between 2 is equal to 3 each 6 shared into 2 equal groups – there are 3 in each group 6 is the dividend, 2 is the divisor, 3 is the quotient 13 ÷ 4 13 is divided into groups of 4. There are 3 groups and a remainder of 1. 13 divided into groups of 4 is equal to 3 remainder 1 The remainder is always less than the divisor If the dividend is not a multiple of the divisor, there is a remainder

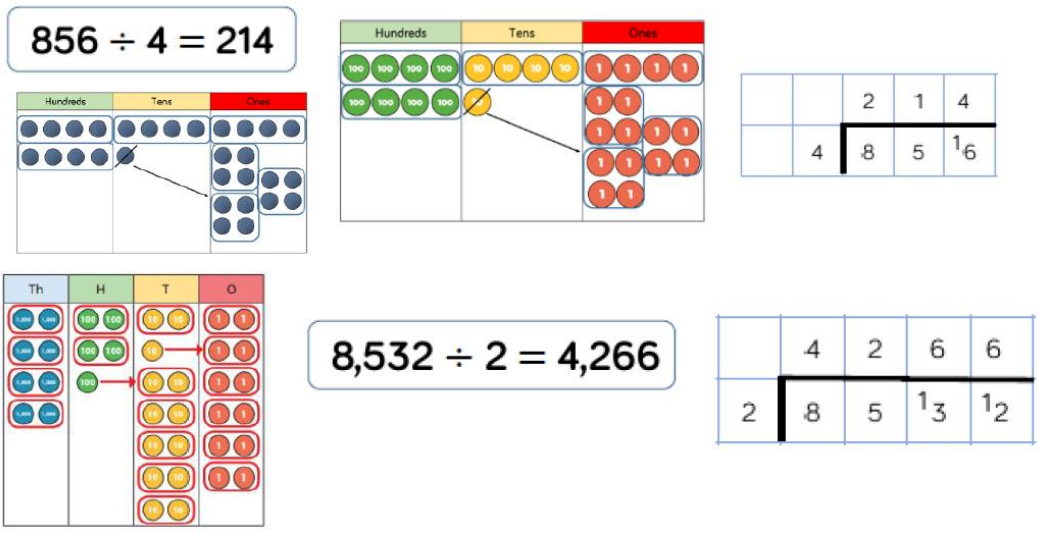
Teaching guidance	• Dividend ÷ divisor = quotient • When dividing numbers involving an exchange, children can use base 10 and place value counters to exchange one ten for ten ones. • Children should start with the equipment outside of the place value grid before sharing the tens and ones equally between the rows • Flexible partitioning in a part whole model supports this method • When introducing short division, limit numbers to no remainders, then limit numbers to no remainders in the final answer but with remainders occurring within the calculation
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 • Recognise, find and write fractions of a discrete set of objects • *Pupils connect tenths to place value, decimal measures and division by 10* • *Pupils understand the relation between unit fractions as operators (fractions of), and division by integers* • *They continue to recognise unit fractions as a division of quantity*

Year 4 Division

Key Language	dividend, divisor, quotient, one each, two each, group, groups of, lots of, array, divide, divided by, division, grouping, sharing, remainder, inverse, short division, multiple, divisible by, factor
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Recall division facts for multiplication tables up to 12 x 12 • Use place value, known and derived facts to multiply mentally, including dividing by 1 • *Pupils continue to practise recalling and using multiplication tables and to aid fluency* • *Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example (600 ÷3 = 200 can be derived from 2 x 3 = 6)* • *Pupils practise to become fluent in the formal written method of short division with exact answers* • *Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as three cakes shared equally between 10 children*
Representations to support mental and written calculations	
Stem sentences	6 divided between 2 is equal to 3 each 6 shared into 2 equal groups – there are 3 in each group 6 is the dividend, 2 is the divisor, 3 is the quotient 13 ÷ 4 13 is divided into groups of 4. There are 3 groups and a remainder of 1. 13 divided into groups of 4 is equal to 3 remainder 1 The remainder is always less than the divisor If the dividend is not a multiple of the divisor, there is a remainder _____ divided by 10 is equal to ____ _____ is ten times smaller than ____ 84 ÷ 4 = 21 8 tens divided between 4 is equal to 2 tens each. 4 ones divided between 4 is equal to 1 each. 8 tens and 4 ones divided between 4 is equal to 2 tens and 1 one, which is 21 (Partitive)

	84 ÷ 4 = 21 8 tens are divided into groups of 4. There are 2 groups. 4 ones are divided into groups of 4. There is 1 group. 2 groups of ten and 1 one is 21. The quotient is 21 (Quotitive)
Teaching guidance	• Dividend ÷ divisor = quotient • Use partitioning to support mental calculation e.g. 56 • Use partitioning to support mental calculation e.g. 56 ÷ 4 = 40 ÷ 4 and 16 ÷ 4 • Only use short division beyond the twelfth multiple • When dividing numbers involving an exchange, children can use Base 10 and place value counters to exchange one ten for ten ones • Children should start with the equipment outside of the place value grid before sharing the tens and ones equally between the rows • Flexible partitioning in a part whole model supports this method • When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor • Language is important here. Children should consider 'How many groups of 4 tens can we make?' and 'How many groups of 4 ones can we make?' • Remainders can also be seen as they remain ungrouped • Children who are confident can move onto dividing a 3-digit number by a 1-digit number • Children can continue to use place value counters to share 3 digit numbers into equal groups. This method can also help to highlight remainders. Flexible partitioning in a part-whole model supports this method
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten • Solve problems involving increasingly harder fractions to calculate quantities., and fractions to divide quantities, including non-unit fractions where the answer is a whole number • Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of digits in the answer as ones, tenths and hundredths • *Pupils understand the relationship between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths* • *Pupils are taught throughout that fractions and decimals are different ways of expressing numbers and proportions* • *Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of a whole number by 10 and later 100* • Convert between different units of measure [for example, kilometres to metres, hour to minute] • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days

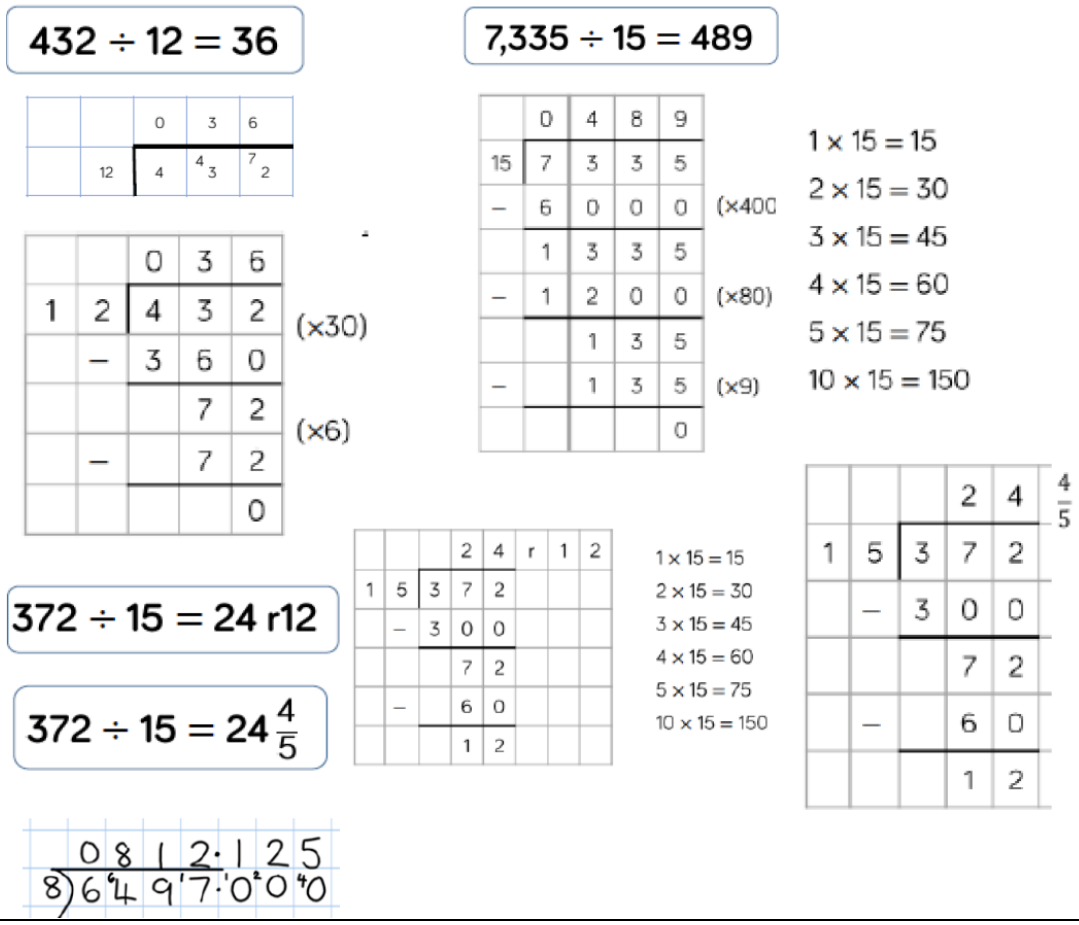
Year 5 Division

Key Language	dividend, divisor, quotient, one each, two each, group, groups of, lots of, array, divide, divided by, division, grouping, sharing, remainder, inverse, short division, multiple, divisible by, factor, prime number, prime factor, composite number (not prime)
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • Know and use vocabulary of prime numbers, prime factors and composite (non-prime) numbers • Establish whether a number up to 100 is prime and recall prime numbers up to 19 • Divide numbers mentally drawing upon known facts • Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • Divide whole numbers and those involving decimals by 10, 100 and 1000 • Solve problems involving division including using their knowledge of factors and multiples, squares and cubes • Solve problems involving division, including scaling by simple fractions and problems involving simple rates • *Pupils practise and extend their use of the formal written methods of short division. They apply all the multiplication tables and related division facts, commit them to memory and use them confidently to make larger calculation* • *They understand the terms factor, multiple and prime, square and cube numbers* • *Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders as fractions, as decimals or by rounding (for example 98 ÷4 = $\frac{98}{4}$ = 24 r2 = 24$\frac{1}{2}$ = 24.5 ≈25)* • *Pupils use multiplication and division as inverses to support the introduction of ratio in Year 6, for example, by multiplying and dividing powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres* • *They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence* • *Pupils use and explain the equals sign to indicate equivalence, including in missing number problems*
Representations to support mental and written calculations	

Stem sentences	6 divided between 2 is equal to 3 each 6 shared into 2 equal groups – there are 3 in each group 6 is the dividend, 2 is the divisor, 3 is the quotient 13 ÷ 4 13 is divided into groups of 4. There are 3 groups and a remainder of 1. 13 divided into groups of 4 is equal to 3 remainder 1 The remainder is always less than the divisor If the dividend is not a multiple of the divisor, there is a remainder _____ divided by 10 is equal to ____ _____ is ten times smaller than ____ 84 ÷ 4 = 21 8 tens divided between 4 is equal to 2 tens each. 4 ones divided between 4 is equal to 1 each. 8 tens and 4 ones divided between 4 is equal to 2 tens and 1 one, which is 21 (Partitive) 84 ÷ 4 = 21 8 tens are divided into groups of 4. There are 2 groups. 4 ones are divided into groups of 4. There is 1 group. 2 groups of ten and 1 one is 21. The quotient is 21 (Quotitive) 342 ÷ 3 3 hundreds divided by 3 is 1 hundred. 4 tens divided by 3 is 1 group of 10 remainder 1 ten. Exchange 1 ten for 10 ones. 12 ones divided by 3 is equal to 4. (Quotative)
Teaching guidance	• Dividend ÷ divisor = quotient • When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor • Language is important here. Children should consider 'How many groups of 4 tens can we make?' and 'How many groups of 4 ones can we make?' • Remainders can also be seen as they remain ungrouped • Children who are confident can move onto dividing a 3-digit number by a 1-digit number • Place value counters or plain counters can be used on a place value grid to support understanding. Children can also draw their own counters and group them through a more pictorial method • Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges • Children need to consider the meaning of the remainder and how to express it, with a fraction, with a decimal, a rounded (up or down) number or a value
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Recognise the percent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal • Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$, and those fractions with a denominator of a multiple of 10 or 25 • *Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions* • *They extend their knowledge of fractions to thousandths and connect to decimals and measures* • *Pupils connect equivalent fractions < 1 that simplify to integers with division and other fractions >1 to division with remainders, using the number line and other models, and hence move from these to improper and mixed fractions* • *Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by fractions, including >1* • *Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities*

	• *Pupils should make connections between decimals, percentages and fractions (for example, 100% represents a whole quantity and 1% is $\frac{1}{100}$, 50 % is $\frac{50,}{100}$, 25% is $\frac{25}{100}$) and relate this to finding 'fractions of'* • Convert between different units of metric measure (for example kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • Solve problems converting units of time • Use division to solve problems involving measure [for example, length, mass, volume, money] using decimal notation; including scaling • *Pupils use their knowledge of place value and division to convert between standard units*

Year 6 Division

Key Language	dividend, divisor, quotient, one each, two each, group, groups of, lots of, array, divide, divided by, division, grouping, sharing, remainder, inverse, short division, multiple, divisible by, factor, prime number, prime factor, composite number (not prime), common factor
NC requirements: Mental and written calculations (non-statutory guidance in italics	• Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret the remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • Divide numbers up to 4 digits by a two-digit whole number using the formal written method of short division, interpreting remainders to the context • Perform mental calculations, including with mixed operations and large numbers • Identify common factors, common multiples and prime numbers • \use their knowledge of the order of operations to carry out calculations involving the four operations • Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy • *Pupils practise division for larger numbers using short and long division* • *Pupils continue to use all multiplication tables to calculate mathematical statements in order to maintain their fluency* • *Pupils explore the order of operations using brackets* • *Common factors can be related to finding equivalent fractions*
Representations to support mental and written calculations	

Stem sentences	6 divided between 2 is equal to 3 each 6 shared into 2 equal groups – there are 3 in each group 6 is the dividend, 2 is the divisor, 3 is the quotient 13 ÷ 4 13 is divided into groups of 4. There are 3 groups and a remainder of 1. 13 divided into groups of 4 is equal to 3 remainder 1 The remainder is always less than the divisor If the dividend is not a multiple of the divisor, there is a remainder _____ divided by 10 is equal to ____ _____ is ten times smaller than ____ 84 ÷ 4 = 21 8 tens divided between 4 is equal to 2 tens each. 4 ones divided between 4 is equal to 1 each. 8 tens and 4 ones divided between 4 is equal to 2 tens and 1 one, which is 21 (Partitive) 84 ÷ 4 = 21 8 tens are divided into groups of 4. There are 2 groups. 4 ones are divided into groups of 4. There is 1 group. 2 groups of ten and 1 one is 21. The quotient is 21 (Quotitive) 342 ÷ 3 3 hundreds divided by 3 is 1 hundred. 4 tens divided by 3 is 1 group of 10 remainder 1 ten. Exchange 1 ten for 10 ones. 12 ones divided by 3 is equal to 4. (Quotative)
Teaching guidance	• Dividend ÷ divisor = quotient • When children begin to divide up to 4-digtis by 2-digits, written methods become the most accurate as concrete and pictorial representations become less effective • Children can write out multiples to support their calculations with larger remainders • Children need to consider the meaning of the remainder and how to express it, with a fraction, a decimal, a rounded (up or down) number or a value
Links to other strands of Maths National Curriculum (including non-statutory guidance in italics)	• Solve number and practical problems that involve numbers up to 10 000 000 and negative numbers • Use common factors to simplify fractions • Divide proper fractions by whole numbers [for example $\frac{1}{3} \div 2 = \frac{1}{6}$] • Associate a fraction with division and calculate decimal fraction equivalents [for example 0.375] for a simple fraction [for example $\frac{3}{8}$] • Divide numbers by 10, 100 and 1000, giving answers to three decimal places • Use written division methods in cases where the answer has up to two decimal places • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts • *Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity [for example if $\frac{1}{4}$ of a length is 36cm, then the whole length is 36cm x 4 = 144cm]* • *Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction [for example 3 ÷8 = 0.375]* • *Pupils divide numbers with up to two decimal places by one-digit and two-digit whole numbers* • *Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication.* • Solve problems involving the relative sizes of two quantities where missing values can be found by using larger integer multiplication and division facts

	• Solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360) • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples • Use simple formulae and express missing number problems algebraically • *Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand* • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit and vice versa, using decimal notation to up to three decimal places • Convert between miles and kilometres • *Pupils could be introduced to compound units for speed, such as miles per hour* • Calculate and interpret the mean as an average • *They should connect conversion from kilometres to miles in measurement to its graphical representation*