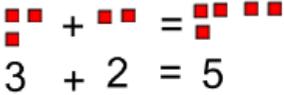
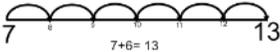
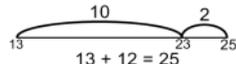
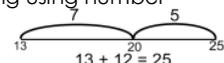
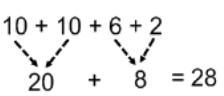
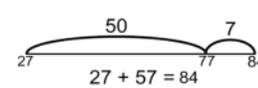
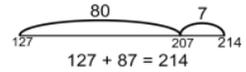
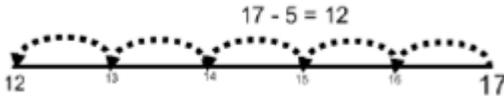
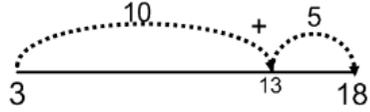
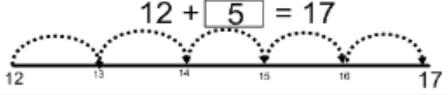


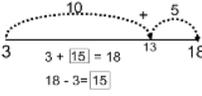
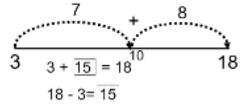
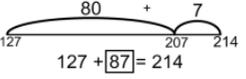
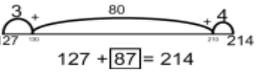
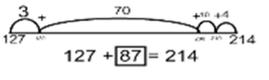
ADDITION

	FOUNDATION STAGE	YEAR 1	YEAR 2
Mental Methods & Skills	<ul style="list-style-type: none"> Count with 1:1 correspondence Recognise numbers Count to 20 and beyond Write numbers Order numbers to 20 Know one more than a number Compare numbers: find 'more' Join two groups of objects together to find the total Count on from a given number 	<ul style="list-style-type: none"> Number pairs with a total of 20 e.g. 13+7 or what to add to a single digit number to make 10, e.g. 3 + \square = 10 Addition facts for totals to at least 5, e.g. 2+3, 4+3 Addition doubles for all numbers to at least 10, e.g. 8+8 Add a pair of single digit numbers, e.g. 4+5 Add a single digit number to a teens number e.g. 13+5 Add a single digit to or from 10 and add a multiple of 10 to a single digit number e.g. 10+7, 7+30 Add near doubles e.g. 6+7 Reorder numbers when adding e.g. put the larger numbers first Count on in ones, twos or tens from largest number. Partition small numbers e.g. 8+3=8+2+1 Partition and combine tens and ones Partition double and adjust, e.g. 5+6=5+5+1 Number bonds and related – facts within 20 Empty box questions: 3 + \square = 7 \square + 4 = 7 	<ul style="list-style-type: none"> Number pairs with totals to 20 All pairs of multiples of 10 with totals of up to 100 e.g. 30+70, or 60+ \square = 100 What must be added to any two digit number to make the next multiple of 10 e.g. 52+ \square =60 Addition doubles for all numbers to 20 e.g. 17+17 and multiples of 10 to 50 e.g. 40+40 Add a pair of single digit numbers, including crossing 10, e.g. 5+8 Add any single digit number to a multiple of 10, e.g. 60+5 Add a single digit number to or from a two-digit number, including cross the tens boundary, e.g. 23+5 then 28+5 Add a multiple of 10 to any two digit number, e.g. 27+60 Add 9,19,29... or 11,21,31 ... Add near doubles e.g. 13+14, 39+40 Partition: bridge through 10 and multiples of 10 when adding Partition and combine multiples of tens and ones Partition: count on in tens and ones to find the total Add two 2 digit numbers
Written Methods & Skills	<p>Simple number sentences</p> <p>Children to use simple pictures to add e.g:</p> <div style="text-align: center;">  </div>	<p>Children to write number sentences</p> <p>Children to show jumps on laminated number line:</p> <p>Show the jumps on a number line as 'counting on' e.g:</p> <div style="text-align: center;">  </div> <p>Children encouraged to draw the jumps. Introduce the inverse of addition: How many jumps to count on from 7 to 13? Inverse operations to be recorded as number sentences. Link to subtraction. Children to use concrete objects/ pictorial representations for missing number problems.</p>	<p>Children to write jottings/ working in support of partition.</p> <p style="text-align: right;">$13 + 12 = 10 + 10 + 3 + 2$</p> <p>e.g:</p> <p>Full partition is still encouraged at this point. (Partition both of the numbers.)</p> <p>Inverse operations (including addition of 10s) to be recorded as number sentences. Link to subtraction</p> <div style="text-align: right;"> $60 + \square = 100$ </div> <p>Blank number lines to extend addition rather than simply 'counting on':</p> <div style="text-align: right;">  </div> <p>Written understanding of place value: $12 = 10 + 2$ $107 = 100 + 0 + 7$</p>
Resources, Models & Images	Counting objects Unifix/ eggboxes Counters Number cards/tiles Hoops Large calculation symbols	100 squares Number lines Empty number lines Large calculation Counting objects Subitizing/ number cards Diennes Counting sticks Hoops Unifix/ eggboxes Symbols Bead strings Arrow cards Numicon	100 squares Number lines Empty number lines Large calculation Counting objects Subitizing/ number cards Diennes Counting sticks Hoops Unifix/ eggboxes Symbols Bead strings Arrow cards Numicon
Vocabulary	Add makes biggest More altogether after Count order one more Count on bigger next largest	Combine Number Sentence Partition Pairs Doubles Empty box Total Multiple Largest Digit Near double Operation Sum Increase More	Crossing tens boundary Bridge through tens Inverse Place Value Greater than

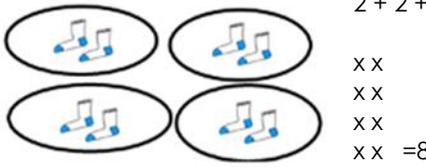
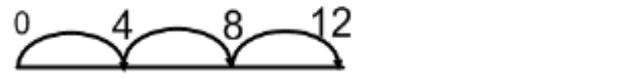
	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Mental Methods & Skills	<ul style="list-style-type: none"> Addition facts for all numbers to 20, e.g. $9 + 9$, drawing on knowledge of inverse operations Sums of multiples of 10, e.g. $50 + 80$ Pairs of two-digit numbers with a total of 100, e.g. $32 + 68$, or $32 + \square = 100$ Addition doubles for multiples of 10 to 100, e.g. $90 + 90$ Add groups of small numbers, e.g. $15 + 3 + 2$ Add two-digit numbers e.g. $34 + 65$ Add near doubles, e.g. $18 + 16$, $60 + 70$ Partition: add tens and ones separately, then recombine Partition: count on in tens and ones to find the total Partition: add 10 or 20 and adjust Partition: count on in minutes and hours, bridging through 60 (analogue times). Add a 3 digit number to $1/2/3$ digit numbers 	<ul style="list-style-type: none"> Sums of pairs of multiples of 10, 100 or 1000 Addition doubles of numbers 1 to 100, e.g. $38 + 38$ What must be added to any three-digit number to make the next multiple of 100, e.g. $521 + \square = 600$ Pairs of fractions that total 1 Add or subtract any pair of two-digit numbers, including crossing the tens and 100 boundary, e.g. $47 + 58$ Count on in hundreds, tens and ones Add a near multiple of 10 e.g. $56 + 29$ Add near doubles of two-digit numbers e.g. $38 + 37$. Add two-digit or three-digit multiples of 10, e.g. $140 + 150$ Partition: add a multiple of 10 and adjust e.g. $56 + 29 = 56 + 30 - 1$ Use knowledge of place value and related calculations e.g. work out $140 + 150 = 290$ using $14 + 15 = 29$ Partition: count on in minutes and hours, bridging through 60 (analogue and digital times). Partition up to 4 digits Understand multiples of 6,7,9,25,1000 	<ul style="list-style-type: none"> Doubles of decimals, e.g. double 3.4 What must be added to any four-digit number to make the next multiple of 1000, e.g. $4087 + \square = 5000$ What must be added to a decimal with units and tenths to make the next whole number, e.g. $7.2 + \square = 8$ Add a pair of two digit numbers or three digit multiples of 10 e.g. $38 - 86$, $350 + 360$ Add a near multiple of 10 or 100 to any two digit or three digit number, e.g. $235 + 198$ (and adjust) Add any pairs of decimal fractions each with units and tenths e.g. $5.7 + 2.5$ Count on in hundreds, tens, ones and tenths from any number Partition: add hundreds, tens or ones separately, then recombine Add a multiple of 10 or 100 and adjust Use knowledge of place value and related calculations, e.g. $6.3 + 4.8$ using $63 + 48$ Partition: count on in minutes and hours, bridging through 60 (analogue and digital times) 	<ul style="list-style-type: none"> Addition facts for multiples of 10 to 1000 and decimal numbers with one decimal place, e.g. $650 + \square$ $1.4 = 2.5$ What must be added to a decimal with units, tenths and hundredths to make the next whole number e.g. $7.26 + \square = 8$ Add pairs of decimals with units, tenths or hundredths e.g. $0.7 + 3.38$ Find doubles of decimals each with units and tenths e.g. $1.6 + 1.6$ Add near doubles of decimals e.g. $2.5 + 2.6$ Add a decimal with units and tenths, that is nearly a whole number e.g. $4.3 + 2.9$ Count on in hundreds, tens, ones, tenths and hundredths Use knowledge of place value and related calculations e.g. $680 + 430$, $6.8 + 4.3$, $0.68 + 0.43$ can all be worked out using the related calculation $68 + 43$ Partition: add a whole number and adjust e.g. $4.3 + 2.9 = 4.3 + 3 - 0.1$ Partition: count on in minutes and hours, bridging through 60 (analogue and digital times, 12 hour and 24 hour clock)
Written Methods & Skills	<p>Children to develop use of number lines. Different methods relate to: Adding on 'partitioned' numbers e.g.</p>  <p>Adding on via bridging using number bonds – e.g.</p>  <p>Developed working/ jottings for partition:</p> $16 + 12 = 10 + 10 + 6 + 2$  <p>Introduce formal columnar methods: Teach simple examples that do not involve 'carrying' first.</p> $\begin{array}{r} 135 \\ + 23 \\ \hline 178 \end{array}$	<p>Develop the partition approach as highlighted in year 3 to larger numbers. (Hundreds/ tens/ units)</p> <p>Develop the number line method highlighted in year 3 to larger numbers. e.g</p>  <p>Embed formal column addition to use of 4 digits once understanding of place value has been embedded through use of number lines, etc.</p> <p>ENSURE children understand the place value reasoning behind the carrying. e.g- $5 + 8 = 13 = 1$ ten and 3 units.</p> $\begin{array}{r} 1335 \\ + 1238 \\ \hline 2573 \\ 1 \end{array}$	<p>Extend number line methods to include hundreds. e.g:</p>  <p>Highlight importance of number line when dealing with time problems.</p> <p>Extend column method to larger numbers as well as introducing decimals.e.g:</p> $\begin{array}{r} 128.7 \\ + 33.9 \\ \hline 162.6 \\ 1 \end{array}$ <p>Partition of decimals to be taught: $8.5 + 5.9 = 13 + 1.4 = 14.4$</p>	<p>Consolidate and extend written approaches and teach children to use the most effective strategy when dealing with different problems.</p> <p>Continue to encourage drawings/ diagrams/ pictures when solving complex problems.</p> <p>Partition of decimals to be extended to 'thousands': $0.7 + 3.38 =$</p> $3 + \quad = 3$ $0.7 + 0.3 = 1$ $0.08 \quad = 0.08 = 4.08$ <p>At all times, effective rounding/ estimation of the addition is important here.</p> <p>Teaching of algebra: Can start from- $6 + x = 10$</p> <p>Progress to multi- step problems involving algebraic language.</p>
Resources , Models & Images	Place value slider. Estimate Arrow cards Approximate Place value mat (10, 100, 1000) Diennes	Fraction shapes/cards Place value mat (to decimals) Diennes	Place value mat to decimals and hundredths Diennes	Place value mat to decimals and hundredths Diennes
Vocabulary	Most significant Minutes Partition Hours Re combine Adjust	Fraction Tenth Decimal Part Whole	Hundredths	Thousandths

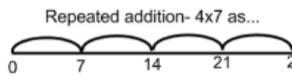
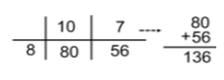
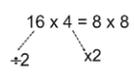
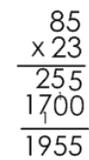
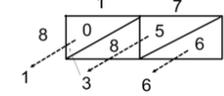
SUBTRACTION

	FOUNDATION STAGE	YEAR 1	YEAR 2
Mental Methods & Skills	<ul style="list-style-type: none"> Count backwards from 10 to 0 Count backwards from 20 – 0 Number rhymes on songs, counting back in ones i.e. 10 green bottles Know one less Use objects to make smaller amounts Use objects to 'take away' 	<ul style="list-style-type: none"> Subtract a pair of single-digit numbers e.g. 8 – 3 Subtract a single-digit number from a teens numbers e.g. 17 – 3 Subtract a single-digit from 10 or 20 Count back in ones, two or tens Partition small numbers e.g. 8 – 3 = 8 – 2 – 1 Know one less Know largest and smallest number Count back from any number to 50 Practical strategies to see 'difference' to see how many more are needed to make a bigger number Know by heart subtraction facts to 10 and 20 	<ul style="list-style-type: none"> Subtraction facts for all numbers up to at least 20 e.g. 8 – 5 What must be subtracted from any two-digit number to make the next multiple of 10 e.g. 52 - □ = 50 Know largest number comes first when subtracting Partition: bridge through 10 and multiples of 10 when subtracting Partition: count on or back in tens and ones to find the difference Know halves of numbers to 20 Subtract a single-digit number from a two-digit number, including crossing the tens boundary e.g. 57 – 3, 52 – 7, 37 – 12 = 37 – 10 – 2 Subtract a multiple of 10 from any two-digit number e.g. 72 – 50 Subtract 9, 19, 29 or 11, 21, 31 ... by subtracting a multiple of 10 and adjusting Subtract any single-digit number from a multiple of 10 e.g. 80 – 7 Subtract a pair of single-digit numbers, including crossing 10 e.g. 12 – 7 Subtract a 2 digit number from a 2 digit number
Written Methods & Skills	<p>Simple linear number sentences written in books, e.g:</p> $5 - 2 =$ <p>Use of pictures/ crossings out to model the subtraction, e.g:</p> $6 - 2 = 4$ 	<p>Extend the linear number sentences to larger numbers (under 20). Use diagrams to illustrate problem and cross out to show the part/s being subtracted.</p> <p>Also use number lines to show the subtraction as in counting back.</p>  <p>Children to use concrete objects/ pictorial representations for missing number problems.</p> $7 = \square - 9$	<p>Children able to use empty number lines to find differences:</p>  <p>Also, extend idea of counting back to showing the difference by 'counting on' e.g:</p> 
Resources Models & Images	<p>Counting objects Hoops Number cards Music and rhyme Number lines</p>	<p>Number line Empty number line Counting objects Hoops/plates/bags etc Number squares 100 squares</p> <p>Unifix/ eggboxes Multi-link Pennies Counting sticks Bead strings</p>	<p>Number line Empty number line Counting objects Hoops/plates/bags etc Number squares 100 squares Arrow cards</p> <p>Unifix/ eggboxes Multi-link Pennies Counting sticks Bead strings Diennes</p>
Vocabulary	<p>Less One less Take away Number Before How many are left</p> <p>Smaller Equals Back Backwards</p>	<p>Less Before Lowest Highest Number sentence Difference Less than Subtract Take away</p> <p>How many left Fewer How many more Partition Digit Teens number Subtraction Equals</p>	<p>Less Before Lowest Highest Number sentence Difference Less than Subtract Take away</p> <p>How many left Fewer How many more Partition Digit Teens number Subtraction Equals Difference between</p> <p>Difference Minus</p>

	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Mental Methods & Skills	<ul style="list-style-type: none"> Subtract groups of small numbers e.g. 15 – 3 – 8 Subtract a two-digit number from a multiple of 10 e.g., 90 – 27 Subtract two-digit numbers e.g. 68 – 35 Subtraction facts for all numbers to 20 e.g. 17 – 9, drawing on knowledge of inverse operations Differences of multiples of 10, e.g. 120 – 90 Subtract by counting up from the smallest number to the largest number Partition: count back in tens and ones to find the difference Partition: subtract 10 or 20 and adjust Partition: count back in minutes and hours, bridging through 60 (analogue times) Make decisions about whether to count on or back to subtract 3 digit numbers and 1 digit numbers 	<ul style="list-style-type: none"> Count back in hundreds, tens and ones Partition: subtract tens and then ones e.g. subtracting 27 by subtracting 20 then 7. Subtract by counting up from the smaller to the larger number Partition: subtract a multiple of 10 and adjust e.g. 86 – 38 = 86 – 40 + 2 Use knowledge of place value and related calculations e.g. work out 290 – 150 = 140 because 29-15=14 Partition: count back in minutes and hours, bridging through 60 (analogue and digital times) Subtract any pair of two-digit numbers, including crossing the tens and 100 boundary e.g. 91 – 35 Subtract two-digit or three-digit multiples of 10 e.g. 120 – 40, 370 – 180 Differences of pairs of multiples of 10, 100 or 1000 Work up to 4 digits 	<ul style="list-style-type: none"> Count back in hundreds, tens, ones and tenths Subtract by counting up from the smaller to the larger number Subtract a multiple of 10 or 100 and adjust Use knowledge of place value and related calculations e.g. 6.3 – 4.8 using 63 – 48 Partition: count back in minutes and hours, bridging through 60 (analogue and digital times) Subtract a pair of two-digit numbers or three-digit multiples of 10 e.g. 620 – 380 Subtract a near multiple of 10 or 100 to any two-digit or three-digit number e.g. 235 – 198 Find the difference between near multiples of 100 e.g. 607 – 588 or of 1000 e.g. 6070 – 4087 Subtract any pairs of decimal fractions each with units and tenths e.g. 6.3 – 4.8 Differences of decimals e.g. 7.8 – 1.3 Doubles and halves of decimals e.g. half of 5.6, double 3.4 Work up to 4 digits and more 	<ul style="list-style-type: none"> Count back in hundreds, tens, ones, tenths and hundredths Use knowledge of place value and related calculations e.g. 111 – 68 = 43 can be worked out using the related calculation 1.11 – 0.68 = 0.43 Partition: subtract a whole number and adjust e.g. 6.5 – 3.8 = 6.5 – 4 + 0.2 Partition: count back in minutes and hours, bridging through 60 (analogue and digital times, 12 hour and 24 hour clock) Subtraction facts for multiples of 10 to 1000 and decimal numbers with one decimal place e.g. □ – 1.4 = 2.5 What must be added to a decimal with units, tenths and hundredths to make the next whole number e.g. 7.26 + □ = 8 TO SOLVE 8 – 7.26 Subtract a decimal with units and tenths, that is nearly a whole number e.g. 6.5 – 3.8 Subtract pairs of decimals with units, tenths or hundredths e.g. 3.38 – 0.7
Written Methods & Skills	<p>Develop and extend use of number lines to show difference. Distinguish between use of place value/ partitioning and bridging. Teach both- Using understand of place value:</p>  <p>Bridging:</p>  <p>Begin to model column method:</p> $\begin{array}{r} 75 \\ -43 \\ \hline 32 \end{array}$	<p>Develop use (and UNDERSTANDING) of columnar method. Extend to 4 digits.</p> $\begin{array}{r} 675 \\ -48 \\ \hline 27 \end{array}$ <p>Extend use of number lines to larger numbers: Teach how subtraction relates to 'difference' and prove this using the number line:</p>  <p>Bridging examples:</p>  <p>Using additional bridges:</p> 	<p>Extend the written column method with use of decimals. Include examples with 'multiple decomposition':</p> $\begin{array}{r} 2121 \\ 833.5 \\ +123.8 \\ \hline 709.7 \end{array}$ <p>Ensure children to when other methods may be more appropriate. For example, with 100-99, it would make more sense to count on 1 rather than complete all the written working.</p> <p>Teach differences in time using number lines, e.g</p> 	<p>Develop and extend all of the previous methods and teach children to use an efficient method for different problems.</p> <p>Ensure clear understanding is maintained when using decimals. Especially with column subtraction. Teach how to add additional zeroes until the decimal place value is the same for both of the numbers, e.g</p> $\begin{array}{r} 675.31 \\ -48.38 \\ \hline 27.02 \end{array}$
Resources, Models & Images	<p>Number line Multi-link Pennies Empty number line Counting objects Counting sticks Hoops/plates/bags etc. Bead strings Number squares Diennes 100 squares Arrow cards Unifix Place value mats in 10s, 100s.</p>	<p>Number line Multi-link Pennies Empty number line Counting objects Counting sticks Hoops/plates/bags etc. Bead strings Number squares Diennes 100 squares Arrow cards Unifix Place value mats in 10s, 100s. Place value mats to 1000s</p>	<p>Number line Multi-link Pennies Empty number line Counting objects Counting sticks Hoops/plates/bags etc. Bead strings Number squares Diennes 100 squares Arrow cards Unifix Place value mats in 10s, 100s. Place value mats to 1000s</p>	<p>Number line Multi-link Pennies Empty number line Counting objects Counting sticks Hoops/plates/bags etc. Bead strings Number squares Diennes 100 squares Arrow cards Unifix Place value mats in 10s, 100s. Place value mats to 1000s</p>
Vocabulary	<p>Less Less than Subtraction.....Before Subtract Equals Lowest Take away Difference Highest How many left Minus Difference Fewer How many more Difference between Less than Subtract Partition Digit Teens number</p>	<p>Less Less than Subtraction.....Before Subtract Equals Lowest Take away Difference Highest How many left Minus Difference Fewer How many more Difference between Less than Subtract Partition Digit Teens number..Decimal Decimal Fraction</p>	<p>Less Less than Subtraction.....Before Subtract Equals Lowest Take away Difference Highest How many left Minus Difference Fewer How many more Difference between Less than Subtract Partition Digit Teens number..Decimal Decimal Fraction...Hundreths</p>	<p>Less Less than Subtraction.....Before Subtract Equals Lowest Take away Difference Highest How many left Minus Difference Fewer How many more Difference between Less than Subtract Partition Digit Teens number..Decimal Decimal Fractions Hundreths Thousandths</p>

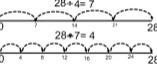
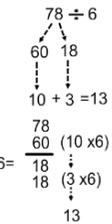
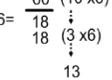
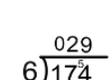
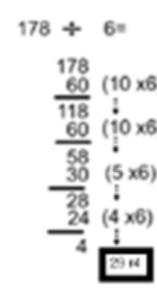
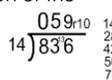
MULTIPLICATION

	FOUNDATION STAGE	YEAR 1	YEAR 2
Mental Methods & Skills	<ul style="list-style-type: none"> Counting in ones and twos Doubling numbers to 5 e.g. double 3 Even and odd numbers to 10. 	<ul style="list-style-type: none"> Count on from and back to zero in ones, twos, fives or tens Doubles of all numbers to 10, e.g. double 6 Odd and even numbers to 20 Use patterns of last digits e.g. 0 and 5 when counting in fives. Think of multiplication as repeated addition e.g. $2+2+2$ or $5+5+5$ or $10p + 10p + 10p$ 	<ul style="list-style-type: none"> Doubles of all numbers to 20 e.g. double 13, and corresponding halves. Doubles of multiples of 10 to 50 e.g. double 40 and corresponding halves. Multiplication facts for the 2, 5 and 10 times-tables, and corresponding division facts Odd and even numbers to 100 Double any multiple of 5 up to 50 e.g. double 35 Find the total number of objects when they are organised into groups of 2, 5 or 10. Understand multiplication as a) repeated addition b) arrays Partition: double the tens and ones separately, then recombine Use knowledge that doubling is equivalent to multiplying by two. Use knowledge of multiplication facts from the 2, 5 and 10 times tables e.g. recognise that there are 15 objects altogether because there are three groups of five. Know multiplication can be done in any order (Commutative law) Know how to represent arrays on a number line.
Written Methods & Skills		<p>Use of informal methods when counting groups of items. (Pictures/ toys/ arrays) How many toys altogether.</p> 	<p>Use of arrays to provide visual representation of multiplying groups of a number. Array can be shown using different symbols. Squares can be used to help organise the working.</p> <p>Highlight link to repeated addition.</p> 
Resources, Models & Images	<p>Number line Counting objects Two plates/circles/hoops for doubling IWB pictures</p>	<p>Number line Counting objects Two plates/circles/hoops for doubling IWB pictures Bead bars/strings Number line Empty number line Pots/plates/bag hoops etc. Numicon</p>	<p>Counters Counting stick Counting objects</p>
Vocabulary	<p>Odd Even Twos Double</p>	<p>Odd Even Twos Double Once Twice Digit Repeated addition</p>	<p>Fives Tens Lots of Groups of</p>
			<p>Odd Even Twos Double Once Twice Digit Repeated addition</p> <p>Multiply Multiple(s) Times Arrays Column Partition x symbol Repeated addition</p> <p>row recombine inverse altogether order pairs groups of</p> <p>Fives Tens Lots of</p>

	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Mental Methods & skills	<ul style="list-style-type: none"> Multiplication facts for the 2,3,4,5,8 and 10 times tables and corresponding division facts. Doubles of multiples of 10 to 100 e.g. double 90 and corresponding halves. Double any multiple of 5 up to 100 e.g. double 35. Partition: when doubling, double the tens and ones separately then recombine. Use knowledge that halving and doubling are inverse operations. Know associative law i.e. $6 \times 4 = 6 \times (2 \times 2)$ Know distributive law i.e. $5 \times 6 = (5 \times 2) + (5 \times 4)$ Multiply one digit or two-digit numbers by 10 or 100 e.g. 7×100, 46×10, 54×100 Recognise that when multiplying by 10 or 100 the digits move one or two places to the left and zero is used as a place holder. 	<ul style="list-style-type: none"> Multiplication facts 6 to 10 x 10 and the corresponding division facts. Doubles of numbers 1 to 100 e.g. double 58 and corresponding halves. Doubles of multiples of 10 and 100 and corresponding halves Factor pairs for known multiplication facts. Double any two-digit number e.g. double 39. Double any multiple of 10 or 100 e.g. double 340, double 800 and halve the corresponding multiples of 10 and 100. Multiply a multiple of 10 to 100 by a single-digit number e.g. 40×3. Multiply numbers to 20 by a single-digit e.g. 17×3 using partitioning. Multiply numbers to 1000 by 10 and then 100 (whole-number answers) e.g. 325×10, 42×100 Partition: double the tens and ones separately, then recombine. Use understanding that when a number is multiplied or divided by 10 or 100 its digits move one or two places to the left or the right and zero is used as a place holder. Use knowledge of multiplication facts and place value e.g. $7 \times 8 = 56$ to find 70×8, 7×80. Use partitioning and the distributive law to multiply e.g. $13 \times 4 = (10 + 3) \times 4$ $= (10 \times 4) + (3 \times 4)$ $= 40 + 12 = 52$ Find unit fractions and simple non-unit fractions of numbers and quantities e.g. $\frac{1}{2}$ of 24 by $\div 8 \times 3$ 	<p>Squares to 10 x 10</p> <ul style="list-style-type: none"> Multiply whole numbers and decimals by 10, 100 or 1000 e.g. 4.3×10, 0.75×100. Multiply pairs of multiples of 10 e.g. 60×30 and a multiple of 100 by a single digit number e.g. 900×8. Find fractions of whole numbers or quantities e.g. $\frac{2}{3}$ of 27, $\frac{4}{5}$ of 70 kg using \div and \times. Find factor pairs for numbers to 100, e.g. 30, 2×15, 3×10 and 5×6. Be able to choose an efficient method Multiply two-digit numbers by 4 or 8 e.g. 26×4 by repeated doubling. Multiply two-digit numbers by 5 or 20 e.g. 320×5, 14×20 i.e. to \times by 5, \times by 10 and half or $\times 20$ is $\times 10$ and double. Multiply by 25 and 50 e.g. 48×25, 32×50. Double three-digit multiples of 10 to 500 e.g. 380×2. Use knowledge of doubles and understanding of place value e.g. when multiplying by 50 multiply by 100 and divide by 2. Use understanding that when a number is multiplied or divided by 10 or 100, its digits move one or two places to the left relative to the decimal point and zero is used as a place holder. Prime numbers to 19 Multiply 4 digit by 1 or 2 digits mentally when appropriate 	<ul style="list-style-type: none"> Square numbers to 12×12 Squares of the corresponding multiples of 10 Prime numbers less than 100 Identify numbers with odd and even numbers of factors and no factor pairs other than 1 and themselves. Use knowledge of multiplication and division facts to identify factor pairs and numbers with only two factors. Multiply pairs of two-digit and single-digit numbers e.g. 28×3 Double decimals with units and tenths e.g. double 7.6 Multiply decimals by 10 or 100 and understand its digits move one or two places to the left relative to the decimal point and that zero is one place holder i.e. $0.078 \times 100 = 7.8$ Multiply pairs of multiples of 10 and 100 e.g. 50×30, 600×20 Multiply two-digit decimals such as 0.8×7 Recognise how to scale up or down using multiplication and division e.g. if three oranges cost 24p One orange costs $24 \div 3 = 8p$ Four oranges cost $8 \times 4 = 32p$ Find 10% or multiples of 10% of numbers and quantities i.e. 70% of 200 g Understand 'powers' Be able to choose an efficient method. Multiply integers with fractions Solve multiplications with brackets
Written Methods & Skills	<p>Show repeated addition as movement along a number line. Important to show increments along the number line. Partition to also be recorded as jottings/ working. e.g. $12 \times 4 = 10 \times 4$ add 2×4</p>  <p>Repeated addition- 4×7 as...</p> <p>Ensure clear understanding of place value. Highlight effect of \times by 10. This does NOT just mean add a zero. Teach the EFFECT it has on the original number.</p>  <p>Introduce simple grid methods for organising partition approaches to multiplication. Eg $17 \times 8 = 10 \times 8$ add 7×8:</p>	<p>Develop use of grids to support partitioning of larger numbers. Highlight the importance of careful addition of the separate parts:</p> <p>Begin to develop written jottings of 'mental manipulation' of multiplication: e.g. $16 \times 4 = 8 \times 8$</p>  <p>Teach when appropriate to manipulate the numbers.</p>  <p>Introduce formal written methods for multiplication. Long multiplication example:</p>	<p>Develop formal written approaches to 4 digits- encourage use of 'Italian Multiplication' as it shows the separate 'mini calculations'</p>  <p>Continue to extend written jottings in support of mental methods- partitioning/ number manipulation, etc.</p> <p>e.g. partitioning of decimals $7 \times 8.5 = 56 + 3.5 = 59.5$</p> <p>When both numbers include a decimal, choose an appropriate written approach and teach HOW to manipulate number to take account of the decimal.</p>	<p>Extend previous written methods (formal and informal), for use when solving more complex problems.</p> <p>Continue to encourage drawings/diagrams/ pictures when solving complex problems. Encourage 'adjustment' of the original numbers by \times by 10/100 etc to remove decimals & then inverse to find solution.</p> <p>At all times, effective rounding/ estimation of the multiplication is important here.</p> <p>More developed partition may be appropriate- e.g. $17 \times 8 = 20 \times 8$ minus 3×8 BUT children should be encouraged to work positively (use of addition whenever they can- e.g. $17 \times 8 = 10 \times 8$ add 7×8)</p>
Resources, Models & Images	<p>Number line Arrays Counting objects Counters</p> <p>Counting stick IWB pictures</p> <p>Counting objects 100 squares Bead bars /strings</p> <p>Number line Empty number line</p> <p>Pots/plates/bag hoops etc Two plates/ circles/ hoops for doubling Place value charts</p> <p>Place value apparatus i.e. Diennes Marked but unnumbered lines Multiplication squares</p>	<p>Number line Arrays Counting objects</p> <p>Counters Counting stick IWB pictures</p> <p>Counting objects 100 squares Bead bars /strings</p> <p>Number line Empty number line</p> <p>Pots/plates/bag hoops etc Two plates/ circles/ hoops for doubling Place value charts</p> <p>Place value apparatus i.e. Diennes Marked but unnumbered lines Multiplication squares</p>	<p>Number line Arrays Counting objects</p> <p>Counters Counting stick IWB pictures</p> <p>Counting objects 100 squares Bead bars /strings</p> <p>Number line Empty number line</p> <p>Pots/plates/bag hoops etc Two plates/ circles/ hoops for doubling Place value charts</p> <p>Place value apparatus i.e. Diennes Marked but unnumbered lines Multiplication squares</p>	<p>Number line Arrays Counting objects</p> <p>Counters Counting stick IWB pictures</p> <p>Counting objects 100 squares Bead bars /strings</p> <p>Number line Empty number line</p> <p>Pots/plates/bag hoops etc Two plates/ circles/ hoops for doubling Place value charts</p> <p>Place value apparatus i.e. Diennes Marked but unnumbered lines Multiplication squares</p>
Vocabulary	<p>Odd Multiply Row Even Multiple(s)</p> <p>recombine Twos Times inverse pairs</p> <p>Double Arrays altogether Once order Column</p> <p>Twice Partition Fives Tens Lots of Digit \times symbol</p> <p>zero Repeated addition partitioning Associative law</p> <p>place holder Distributive law multiplying</p> <p>Commutative law</p>	<p>Odd Multiply Row Even Multiple(s)</p> <p>recombine Twos Times inverse pairs</p> <p>Double Arrays altogether Once order Column</p> <p>Column Twice Partition Fives Tens Lots of</p> <p>Digit \times symbol zero Repeated addition</p> <p>partitioning Associative law place holder</p> <p>Distributive law multiplying Commutative law</p> <p>factors whole number fraction</p>	<p>Odd Multiply Row Even Multiple(s)</p> <p>recombine Twos Times inverse pairs</p> <p>Double Arrays altogether Once order Column</p> <p>Column Twice Partition Fives Tens Lots of</p> <p>Digit \times symbol zero Repeated addition</p> <p>partitioning Associative law place holder</p> <p>Distributive law multiplying Commutative law</p> <p>factors whole number fraction Square</p> <p>number Decimals Factor pairs Decimal point</p> <p>Repeated doubling Prime numbers</p>	<p>Odd Multiply Row Even Multiple(s)</p> <p>recombine Twos Times inverse pairs</p> <p>Double Arrays altogether Once order Column</p> <p>Column Twice Partition Fives Tens Lots of</p> <p>Digit \times symbol zero Repeated addition</p> <p>partitioning Associative law place holder</p> <p>Distributive law multiplying Commutative law</p> <p>factors whole number fraction Square</p> <p>Decimals Factor pairs Decimal point Repeated</p> <p>doubling prime number Percentage powers</p> <p>Scale up Integers Efficient method Brackets</p>

DIVISION

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Mental Methods & Skills	<ul style="list-style-type: none"> Share toys/counting equipment between 2 or 3 Count to check each group has the same Put apparatus into groups of two, three, four or five Notice when groups of objects are 'the same' Share objects using '1 for you' '1 for you' between bags, plates, bowls, hoops etc. Cut objects and shapes in half with knives and scissors. 	<ul style="list-style-type: none"> Share toys/counting equipment between 2 or 3 Count to check each group has the same Put apparatus into groups of two, three, four or five Notice when groups of objects are 'the same' Share objects using '1 for you' '1 for you' between bags, plates, bowls, hoops etc. Cut objects and shapes in half with knives and scissors. Count back in ones, twos, fives and tens. Halves of all numbers to 10 Begin to know halves of numbers to 20 Know when we share we get 'less' Odd/even numbers Understand division as sharing (one for you) and grouping. Cut shapes, pieces of string, card in half Compare two halves and see that they are exactly the same. 	<ul style="list-style-type: none"> Share toys/counting equipment between 2 or 3 Count to check each group has the same Put apparatus into groups of two, three, four or five Notice when groups of objects are 'the same' Share objects using '1 for you' '1 for you' between bags, plates, bowls, hoops etc. Cut objects and shapes in half with knives and scissors. Count back in ones, twos, fives and tens. Know halves of numbers to 20 Know when we share we get 'less' Odd/even numbers Understand division as sharing (one for you) and grouping. Cut shapes, pieces of string, card in half Compare two halves and see that they are exactly the same. Halves of multiples of 10 to 100 Division facts for 2, 5, 10 x tables Odd and even numbers to 100 Find half of even numbers to 40 Use knowledge that halving is the inverse of doubling Put an odd number of objects into groups of 2 and see what's 'left over' Know/understand division as repeated subtraction Understand division as sharing (one for you) and grouping. Understand division as grouping through arrays. 																																																												
Written Methods & Skills		<p>Use of informal methods when counting and grouping item. (Pictures/ toys/ etc) How many toys in each circle/ group.</p> <div style="text-align: center;"> </div> <p>X X X X X X X X</p> <p>X X = <u>2</u> lots of 5</p>	<p>Use sharing circles to group objects equally.</p> <div style="text-align: center;"> </div> <p>Finding how many are left over. Refer to this as the remainder. Splitting an amount into different groups.</p> <div style="text-align: center;"> </div> <p>Show sharing out initially as repeated subtraction:</p> <div style="text-align: center;"> </div> <p>Use of arrays to provide visual representation of dividing groups of a number. Arrays can be shown using different symbols. Squares can be used to help organise the working.</p> <div style="text-align: center;"> </div> <p>Highlight link to repeated addition.</p>																																																												
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Mental Methods & Skills	<ul style="list-style-type: none"> Halve any multiple of 10 up to 200 e.g. halve 170 Find unit fractions of numbers and quantities involving halves, thirds, quarters, fifths and tenths i.e. find 1/5 by dividing by 5 Multiplication facts for the 2, 3, 4, 5, 8 and 10 times-tables and corresponding division facts. Doubles of multiples of 10 to 100 e.g. double 90 and corresponding halves. Use knowledge of multiples to find quotients i.e. $15 \div 3 = 5$ because there are five threes in fifteen. Partition: when halving, halve the tens and ones separately, then recombine. Use knowledge that halving and doubling are inverse operations. Recognise that finding a unit fraction is equivalent to dividing by the denominator and use knowledge of division facts. Recognise that when dividing by 10 or 100 the digits move one or two places to the right and zero is used as a place holder. Know there will be 'left overs' if you have a number that is not a multiple of the divisor. 	<ul style="list-style-type: none"> Multiplication facts to 12 x 12 and the corresponding division facts. Doubles of numbers 1 to 100 e.g. double 58, and corresponding halves. Doubles of multiples of 10 and 100 and corresponding halves. Fraction and decimal equivalents of one-half, quarters, tenths and hundredths e.g. $3/10$ is 0.3 and $3/100$ is 0.03 Partition: halve the tens and ones separately, then recombine. Use understanding that when a number is divided by 10 or 100, its digits move one or two places to the right and zero is used as a place holder. Choose an efficient method Use knowledge of multiplication facts and place value e.g. $56 \div 8 = 7$ so $560 \div 8 = 70$ Double any multiple of 10 or 100 e.g. double 340, double 800 and halve the corresponding multiples of 10 and 100. Halve any even numbers to 200. Find unit fractions and simple non-unit fractions of numbers and quantities e.g. $\frac{1}{2}$ of 24 Divide numbers to 1000 by 10 and then 100 (whole number answers) e.g. $120 \div 10$, $600 \div 100$, $850 \div 10$ Identify the remainder when dividing by 2, 5, 10 Give the factor pair associated with a multiplication fact e.g. identify that if $2 \times 3 = 6$ then 6 has the factor pair 2 and 3. 	<ul style="list-style-type: none"> Division facts corresponding to tables up to 10 x 10 and the related unit fractions e.g. $7 \times 9 = 63$ so one-ninth of 63 is 7 and one-seventh of 63 is 9. Percentage equivalents of one-half, one-quarter, three-quarters, tenths and hundredths. Factor pairs to 100 Divide by 4 or 8 by repeated halving, or 5 & 10. Form an equivalent calculation e.g. to multiply by 5, multiply by 10 then halve, to multiply by 20, double, then multiply by 10. Use knowledge of doubles/halves and understanding of place value e.g. when multiplying by 50 multiply by 100 and divide by 2. Find fractions of whole numbers of quantities e.g. $2/3$ of 27, $4/5$ of 70 kg Find 50%, 25% or 10% of whole numbers or quantities e.g. 25% of 20 kg, 10% of £80. Use understanding that when a number is divided by 10 or 100 its digits move one or two places to the right relative to the decimal point, and zero is used as a place holder. Use knowledge of multiplication and division facts and understanding of place value e.g. when calculating with multiples of 10 i.e. $760 \div 2$. Use knowledge of equivalence between fractions & percentages e.g. to find 50%, 25%, 10% Use knowledge of multiplication and division facts to find factor pairs. Find the remainder after dividing a two digit number by a single-digit number e.g. $27 \div 4 = 6$ R 3. Divide a multiple of 10 by a single-digit number (whole number answers) e.g. $80 \div 4$, $270 \div 3$. Choose an efficient method. 	<ul style="list-style-type: none"> Equivalent fractions, decimals and percentages for hundredths e.g. 35% is equivalent to 0.35 or 35/100 Partition: use partitioning and the distributive law to divide tens and ones separately e.g. $92 \div 4 = (80 + 12) \div 4 = 20 + 3 = 23$ Form an equivalent calculation e.g. to divide by 25 divide by 100 then multiply by 4; to divide by 50 divide by 100 then double. Use knowledge of the equivalence between fractions and percentages and the relationship between fractions and division. Recognise how to scale down using division e.g. if three oranges cost 24p one orange costs $24 \div 3 = 8$p Converting a remainder to a decimal/fraction in context. Choose an efficient method. Divide a two-digit number by a single digit number e.g. $68 \div 4$ Divide by 25 or 50 e.g. $480 \div 25$, $3200 \div 50$. Double decimals with units and tenths e.g. double 7.6 and find the corresponding halves e.g. half of 15.2 Divide multiples of 100 by a multiple of 10 or 100 (whole number answers) e.g. $600 \div 20$, $800 \div 400$, $2100 \div 300$ Find 10% or multiples of 10%, of whole numbers and quantities e.g. 30% of 50 ml, 40% of £30, 70% of 200 g. Simplify fractions by cancelling. Identify numbers with odd & even numbers of factors & no factor pairs other than 1 & themselves.
Written Methods & Skills	<p>Show repeated addition as movement along a number line. Teach how this can show the equal groups/ divisions along the number line.</p> <p>Important to show increments along the number line. e.g.</p>  <p>Develop use of arrays. Teach how an array can show the related division/ multiplication facts:</p> <p>$4 \times 5 = 20$ $20 \div 4 = 5$</p>  <p>Develop use of number lines- show different interpretations of division:</p> 	<p>Partition of division. Using an effective understanding of the place value for each digit to find the solution:</p>  <p>This develops to chunking:</p>  <p>Bus stop (short division) can then be introduced once clear understanding of the division process has been cemented.</p> 	<p>Extend chunking method to help divide into larger numbers:</p>  <p>Children to recognise how to deal with remainders.</p> <p>For example: As a remainder- 29 r 4 As a fraction- $29 \frac{4}{6}$ As a decimal 26.67 to 2 dp</p> <p>Bus stop division to be developed as appropriate.</p> <p>Children to be encouraged to highlight their wider understanding of number. Use of WIK (What I know) when approaching the division problem.</p> <p>Eg- for $178 \div 6$- I KNOW $30 \times 6 = 180$. I THEN know $29 \times 6 = 174$. So $= 29$ r 4.</p>	<p>Extend previous written methods (formal and informal), for use when solving more complex problems.</p> <p>Continue to encourage drawings/ diagrams/ pictures when solving complex problems.</p> <p>Encourage 'adjustment' of the original numbers by x by 10/100 etc to remove decimals and then inverse to find solution.</p> <p>At all times, effective rounding/ estimation of the division is important here.</p>  <p>When wanting to use bus stop division with numbers over 10, model how to quickly write the number related sequence at the side:</p>
Resource Models & Images	<p>Counting objects Scissors Bows Cubes Plates Counters Hoops Number line Shapes cut in half Bead string/rods Food to cut in half Arrays Empty number lines IWB halve image Unifix cubes Place value cards Arrow cards Multiplication squares</p>	<p>Counting objects Scissors Bows Cubes Plates Counters Hoops Number line Shapes cut in half Bead string/rods Food to cut in half Arrays Empty number lines IWB halve image Unifix cubes Place value cards Arrow cards Multiplication squares</p>	<p>Counting objects Scissors Bows Cubes Plates Counters Hoops Number line Shapes cut in half Bead string/rods Food to cut in half Arrays Empty number lines IWB halve image Unifix cubes Place value cards Arrow cards Multiplication squares</p>	<p>Counting objects Scissors Bows Cubes Plates Counters Hoops Number line Shapes cut in half Bead string/rods Food to cut in half Arrays Empty number lines IWB halve image Unifix cubes Place value cards Arrow cards Multiplication squares</p>
Vocabulary	<p>Share Groups Fours Half Equal Ones Fives Three's Fair Two's Same Halves Equal Back Backwards Smaller Less Fewer Exactly Divide Inverse Remainder Left over Arrays Repeated subtraction Fraction Fifth Chunking Quantity Tenths Partition Short division Thirds Denominator Decimal Quarters Point Recombine Zero Equivalent Divisible Quotient</p> <p>Numerator Decimal point Place holder</p>	<p>Share Groups Fours Half Equal Ones Fives Three's Fair Two's Same Halves Equal Back Backwards Smaller Less Fewer Exactly Divide Inverse Remainder Left over Arrays Repeated subtraction Fraction Fifth Chunking Quantity Tenths Partition Short division Thirds Denominator Decimal Quarters Point Recombine Zero Equivalent Divisible Numerator Decimal point Quotient Place holder Hundredths.....</p>	<p>Share Groups Fours Half Equal Ones Fives Three's Fair Two's Same Halves Equal Back Backwards Smaller Less Fewer Exactly Divide Inverse Remainder Left over Arrays Repeated subtraction Fraction Fifth Chunking Quantity Tenths Partition Short division Thirds Denominator Decimal Quarters Point Recombine Zero Equivalent Divisible Numerator Decimal point Quotient Place holder Hundredths Percentage Three-quarters Scale down/up</p>	<p>Share Groups Fours Half Equal Ones Fives Three's Fair Two's Same Halves Equal Back Backwards Smaller Less Fewer Exactly Divide Inverse Remainder Left over Arrays Repeated subtraction Fraction Fifth Chunking Quantity Tenths Partition Short division Thirds Denominator Decimal Quarters Point Recombine Zero Equivalent Divisible Numerator Decimal point Quotient Place holder Hundredths.....Percentage Three-quarters Scale down/up.. Cancelling.....Simplifying</p>