Mathematics Calculation Policy

Within the MAT, we believe that children should be introduced to the process of calculation through practical, oral and mental activities. As children begin to understand the underlying ideas, they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved.

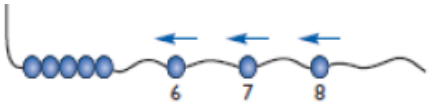
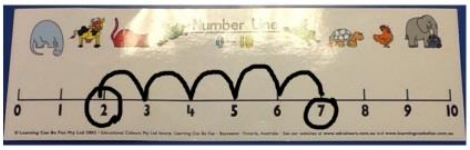
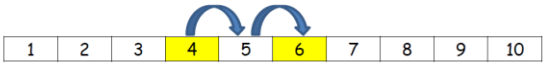
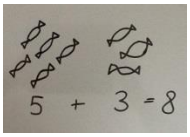
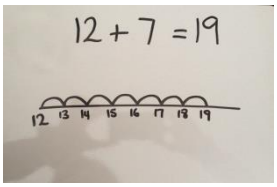
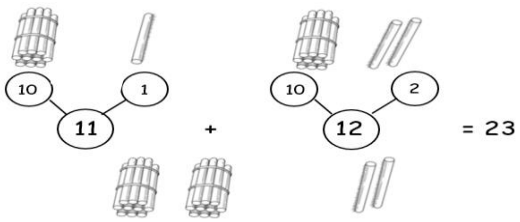
Choosing the appropriate strategy, recoding in mathematics, and in calculation in particular, is an important tool both for furthering the understanding of ideas and for communicating those ideas to others. A useful written method is one that helps children carry out a calculation and can be understood by others.

Written methods are complementary to mental methods and should not be seen as separate from them. The aim is that children use mental methods when appropriate, but for calculations they cannot do in their heads, they use an efficient written method of calculation for addition, subtraction, multiplication and division which they know they can rely on when mental methods are not appropriate.

By the end of Year 6, children should be able to choose an efficient method: mental or written, which is appropriate to a given task. This policy contains the key pencil and paper procedures that will be taught within our schools alongside practical resources. It has been written to ensure consistency and progression throughout the schools within the MAT and reflects a whole school agreement.

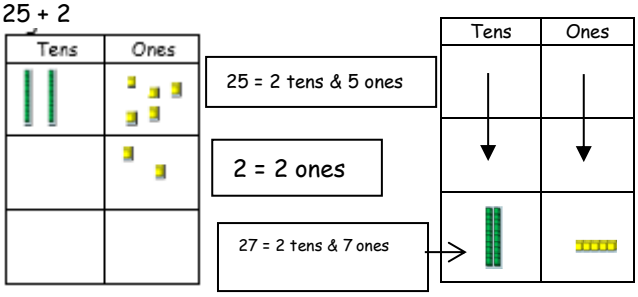
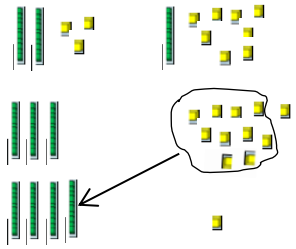
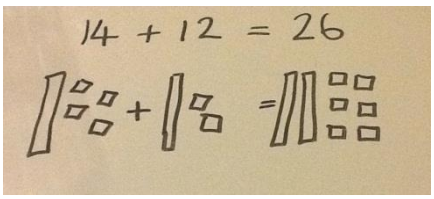
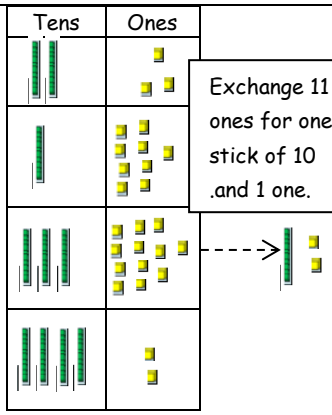
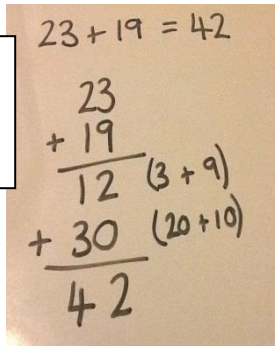
Addition

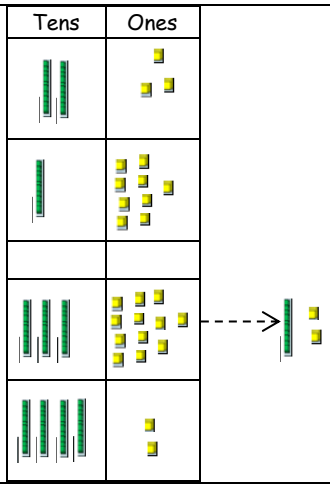
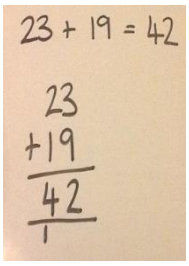
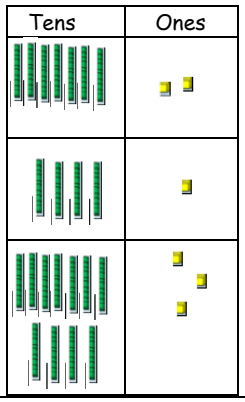
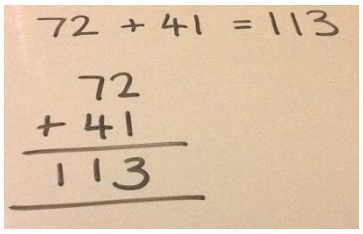
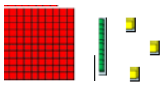
Brooke Hill Academy Trust CALCULATION POLICY	
ADDITION	
EYFS	
VOCABULARY: add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more…, how many more to make… ?, how many more is… than…?	
USEFUL VIDEOS:	
Method	**Example/Representation**
Using a range of practical resources and real life contexts, pupils develop their understanding of the concept of addition through counting activities.	How many dinosaurs are there?  What about if I give you two more? How many are there now? 
Children are introduced to the addition symbol (+) and use pictures/diagrams to represent the calculation.	There are 2 birds. Another bird flies in. How many are there altogether?  + = 3
Store the larger number mentally and use fingers to count on.	Count on from the larger number. A child will choose the larger number, even when it is not the first and count on from there; (5 in your head) 'six, seven, eight' using their fingers: 3 + 5 = 8 
Children represent an addition number sentence in picture form and are able to solve simple addition number sentences using objects or fingers. Children will begin to explain their reasoning.	 5 + 2 = 7  5 + 2 = 7
'Adam the Adder' will be used as an early introduction to a number track. This will help children develop their understanding of addition.	
MENTAL STRATEGIES: - Develop a mental image of the number system. - Understand the value of a number - Counting forwards and backwards - Recall of number bonds to 10	

YEAR 1	
VOCABULARY: number bonds, add, more, plus, make, sum, total, altogether, inverse, double, near double, equals, is the same as (including equals sign) ,score, one more, two more… ten more, how many more to make…?, how many more is… than…?, how much more is…?	
Method:	**Example/Representation:**
Bead strings and counting sticks will be used to support addition.	5 + 3 = 8 
Children will use a prepared number line or track to solve simple addition stories and number sentences.	2 + 5 = 7  4 + 2 = 6 
Children will solve one-step addition problems using concrete objects and/or pictorial representations including missing number problems (6+_=9)	I have 5 sweets and I am given 3 more. How many do I have altogether? 
Children will be taught how to solve simple addition stories with the support of a 100 number square, including crossing the tens boundary.	11 + 7 = 18 
Children are taught how to use a blank number line for addition and then encouraged to draw their own number line to help solve problems, including those that cross the tens boundary.	12 + 7 = 19 
Children will partition numbers into tens and ones when adding two 2-digit numbers that lie within the tens boundary.	
MENTAL STRATEGIES: - Identify 1 more than a given number - Know addition can be carried out in any order (commutative) - Add 1 and 2 digit numbers to 20 including 0 - Number bonds to 10 and 20 - Doubles of numbers up to and including double 10 - Adding 10 to a single digit number	

YEAR 2

VOCABULARY: add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more… ten more… one hundred more, how many more to make…?, how many more is… than…?, how much more is…?, tens boundary, exchanging

Method:	**Example/Representation:**
Children will use concrete objects and pictorial representations to add: a 2-digit number and ones, three 1-digit numbers and a 2-digit number and multiples of 10.	25 + 2 
Children will partition numbers into tens and ones when adding two 2-digit numbers that cross the tens boundary.	23 + 18 = 41 Exchange 11 ones for one stick of 10 and 1 one. 
Children will solve simple addition problems using concrete objects and pictorial representations, including those involving number, missing numbers, quantities and measures.	George has 14 strawberries and Jess has 12 strawberries. How many strawberries are there altogether?  28 + ☐ = 35
Children begin to set out TO + TO (that cross the tens boundary) in columns and record as expanded column addition. (Children do not need to write the brackets)	 

Children begin to set out TO + TO (that cross the tens boundary) in columns and record as column addition.	 
Children begin to set out TO + TO (that cross the hundreds boundary) in columns and record as column addition.	  

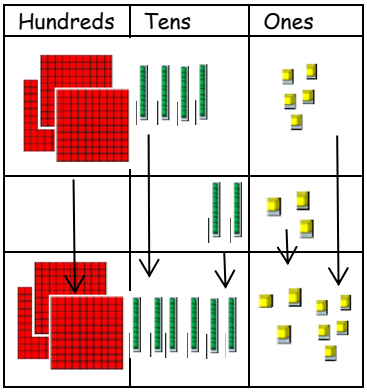
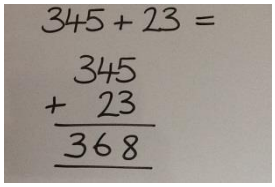
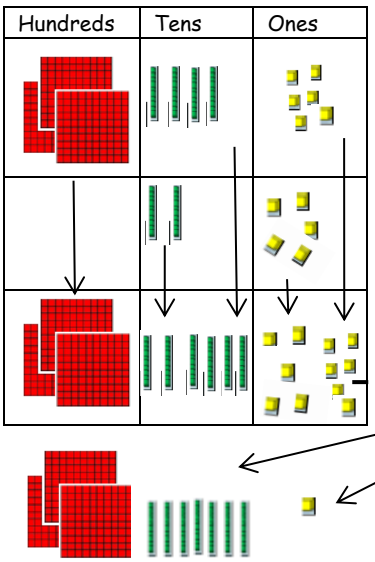
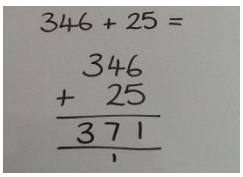
MENTAL STRATEGIES:

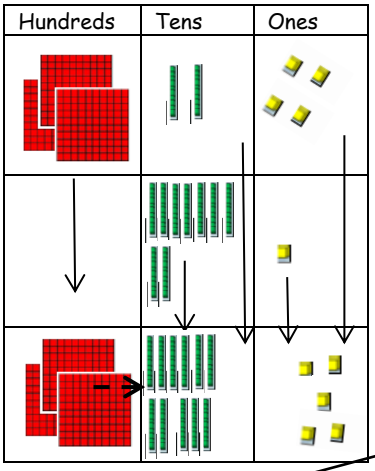
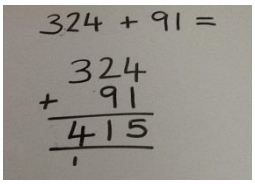
- Know that addition is the inverse of subtraction
- Add numbers mentally, including:
  - A 2-digit number and ones
  - A multiple of 10 to a 2-digit number
  - Two 2-digit numbers
  - Three 1-digit numbers
- Use knowledge of inverse to check calculations and solve missing number problems
- Use knowledge of number bonds to 10 to calculate numbers bonds to 100

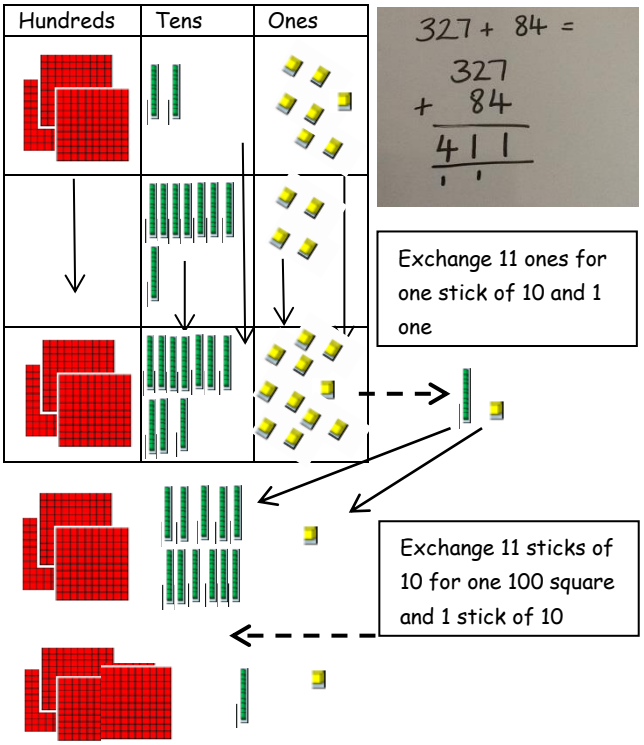
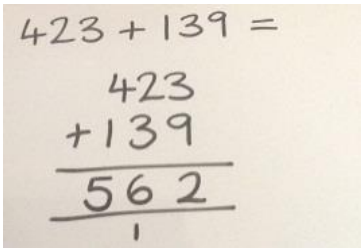
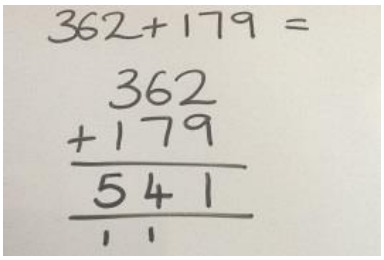
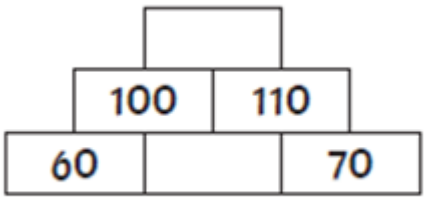
Count on in tens from any given number (e.g 19 – 29 – 39 – 49 etc)

YEAR 3:

VOCABULARY: add, increase, total, plus, sum, more, altogether, column addition, estimate, inverse, double, near double, one more, ten more… one hundred more, how many more to make …? how many more is… than …? how much more is…?, tens boundary, hundreds boundary, exchange.

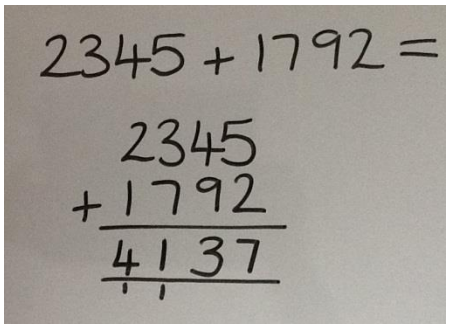
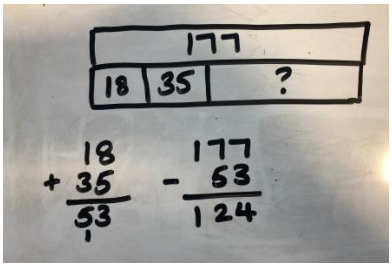
Method:	**Example/Representation:**
Children set out HTO + TO (that lie within the tens boundary) in columns and record as column addition.	 
Children set out HTO + TO (that cross the tens boundary) in columns and record as column addition.	  Exchange 11 ones for one stick of 10 and 1 ones.

Children set out HTO + TO (that cross the hundreds boundary) in columns and record as column addition.	  Exchange 11 sticks of 10 for one 100 square and 1 stick of 10.

Children set out HTO + TO (that cross the hundred and tens boundaries) in columns and record as column addition.	
Children set out HTO + HTO (that cross the tens boundary) in columns and record as column addition.	
Children set out HTO + HTO (that cross the tens and hundreds boundaries) in columns and record as column addition.	
Children will solve one and two-step addition problems (including missing number problems) using concrete objects and pictorial representations.	

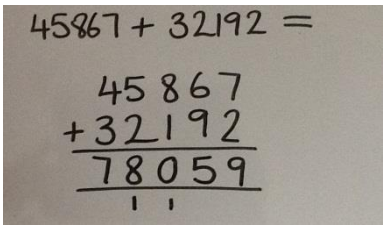
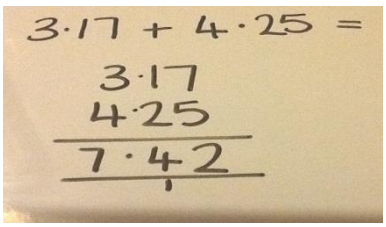
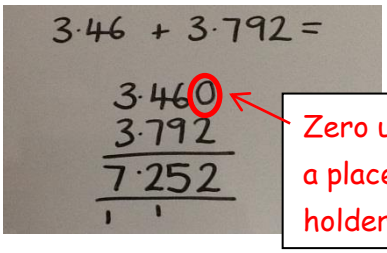
MENTAL STRATEGIES:

- Add numbers mentally, including:
  - a three-digit number and a single digit number
  - a 3-digit number and multiples of 10
  - a 3-digit number and multiples of 100
- Estimate the answer to a calculation and use inverse operations to check answers
- Know number pairs that total 1000 (multiples of 100)
- Calculate 10 or 100 more than any given number
- Continue to practise the number bonds to 100.

YEAR 4	
VOCABULARY: add, addition, more, plus, increase, sum, total, altogether, score, double, near double , tens boundary, hundreds boundary, thousands boundary, inverse	
Method:	**Example/Representation:**
Children will add numbers with up to 4-digits using the formal written method of column addition.	
Solve two-step problems using formal jottings and explaining reasoning behind their calculations.	Seb has 177 cubes. He builds two towers. One tower uses 18 cubes and one tower uses 35 cubes. How many cubes does he have left over? 

MENTAL STRATEGIES:

- Add numbers mentally, including:
  - a four digit number and multiples of one thousand
- Use knowledge of doubles to derive related facts (e.g 15 + 16 = 31 because 15 + 15 = 30 and 30 + 1 = 31)
- Know number pairs that total 1000 (multiples of 10)
- Estimate the answer to a calculation and use inverse operations to check answers

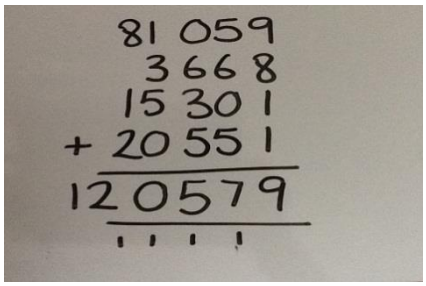
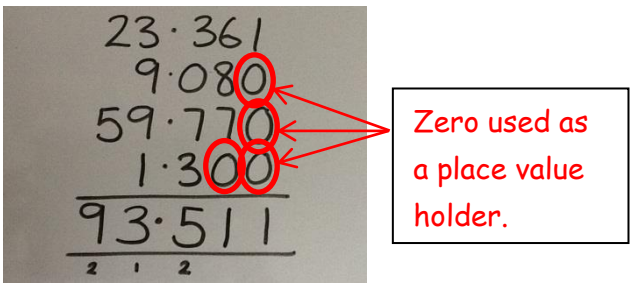
YEAR 5	
VOCABULARY: Efficient written method, add, addition, more, plus, increase, sum, total, altogether, score, tens boundary, hundreds boundary, thousands boundary, ones boundary, tenths boundary, inverse	
Method:	**Example/Representation:**
Children will add numbers with more than 4-digits using the formal written method of column addition.	
Children will add decimal numbers with the same number of decimal places using the formal written method column addition.	
Children will add decimal numbers with a different number of decimal places using the formal written method column addition using 0 as a place value holder.	
Solve multi-step problems (that may include subtraction) using formal jottings and explaining reasoning behind their choice of operation and calculation.	There are 15,600 people at a concert. There are 9,050 adults. The rest are children. How many more adults than children are there?

MENTAL STRATEGIES:

- Add numbers mentally with increasingly large numbers (e.g 10,162 + 2,300 = 12,462)
- Mentally add tenths (e.g 0.2 + 0.6 = 0.8) and 1-digit whole numbers and tenths (8 + 0.3 = 8.3)
- Use number bonds to 100 knowledge to calculate complements to one using hundredths (e.g 0.83 + 0.17 = 1)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

YEAR 6

VOCABULARY: order of operations, column addition, add, in total, answer, tens boundary, hundreds boundary, thousands boundary, millions boundary, ones boundary, tenths boundary, hundredths boundary, decimal place, inverse

Method:	**Example/Representation:**
Children will add several numbers of increasing complexity.	81,059 + 3,668 + 15,301 + 20,551 = 120,579 
Children will add several decimals numbers with a different number of decimal places.	23.361 + 9.08 + 59.77 + 1.3 = 93.511 
Solve multi-step problems (that may include subtraction) using formal jottings and explaining reasoning behind their calculations.	Toy car: £12.49 Board game: £25.38 Building blocks £34.39 Amil and Rikard want to buy one of each toy. Amil rounds the price of each toy to the nearest £10 and adds them together. Rikard adds the exact price of each toy together. What is the difference between Amil's and Rikard's total?

MENTAL STRATEGIES:

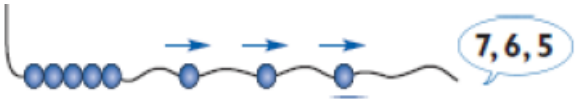
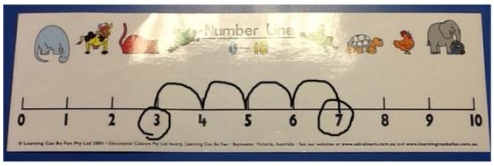
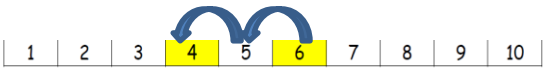
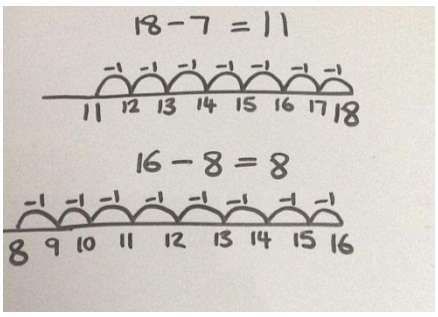
- Add numbers mentally with increasingly large numbers (e.g 10,162 + 2,300 = 12,462)
- Add decimal numbers mentally (up to 2 decimal places)
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Subtraction

Brooke Hill Academy Trust CALCULATION POLICY	
SUBTRACTION	
EYFS	
VOCABULARY: take (away), leave, how many are left/left over?, how many have gone?, one less, two less… ten less…,how many fewer is… than…?, difference between, is the same as	
Method	**Example/Representation**
Using a range of practical resources and real life contexts, pupils develop their understanding of the concept of subtraction as taking away through counting activities.	I had 8 sweets and I ate 2. How many have I got left?
Children will use counting objects, toys or their fingers to answer simple subtraction number sentences.	(e.g. 6-3= 3)
Children will listen to a subtraction story and draw a set of objects (jottings) on whiteboards and cross some off (drawing a picture helps children to visualise the subtraction).	
Children will use their fingers to help with subtraction. E.g. 5 – 2 = 3. They will begin by holding up 5 fingers (the largest numbers) and then put down two fingers to physically take away 2. They will then count how many fingers are remaining (3).	
Children will use 'Suzie the Subtractor' to help develop their understanding of subtraction along a number track.	
MENTAL STRATEGIES: - Develop a mental image of the number system - Children count backwards using familiar number rhymes (e.g '10 Green Bottles', '5 Fat Sausages') - Count backwards from different starting points	

YEAR 1

VOCABULARY: subtract, take away, minus, leave, how many fewer is…than..?, how much less is..? half, halve, how many are left/left over?, how many are gone?, one less, two less, ten less…, how many fewer is… than…?, how much less is…? =, equals, sign, is the same as, count on, count back, difference between. How many more is…than..?, how much more is..?,

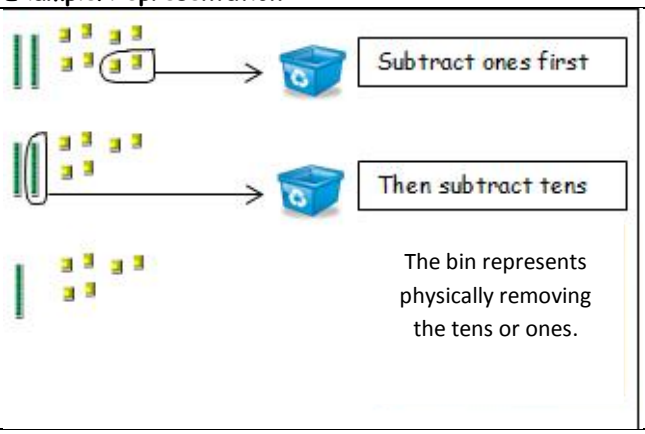
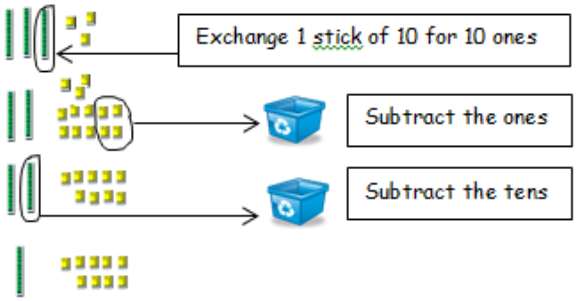
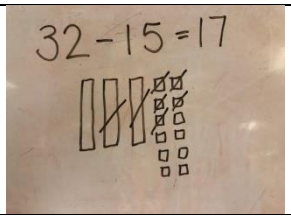
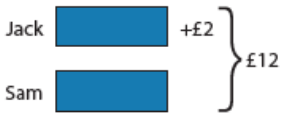
Method:	**Example/Representation:**
Bead strings and counting sticks will be used to support subtraction by counting backwards.	 8 – 3 = 5
Children will use a prepared number line or track to solve simple subtraction stories and number sentences by counting backwards.	 7 – 4 = 3  6 – 2 = 4
Children will solve one-step subtraction problems (including missing number problems) using concrete objects and pictorial representations.	
Children will be taught how to solve simple subtraction stories with the support of a 100 number square. Children will begin with TO – O that lie within the tens boundary then move onto TO – O that cross the tens boundary,	 20 – 4 = 16
Children are taught how to use a blank number line for subtraction (counting backwards) and then encouraged to draw their own number line to help solve problems. Children will begin with TO – O that lie within the tens boundary then move onto TO – O that cross the tens boundary,	

MENTAL STRATEGIES

- Subtract 1 and 2 digit numbers to 20 including 0
- Identify one and ten less than a given number
- To know that subtraction is not commutative and that the larger number must always come first
- Use knowledge of number bonds to 10 and 20 to reason (9 + 1 = 10 so 10 – 9 = 1 and 10 – 1 = 9)

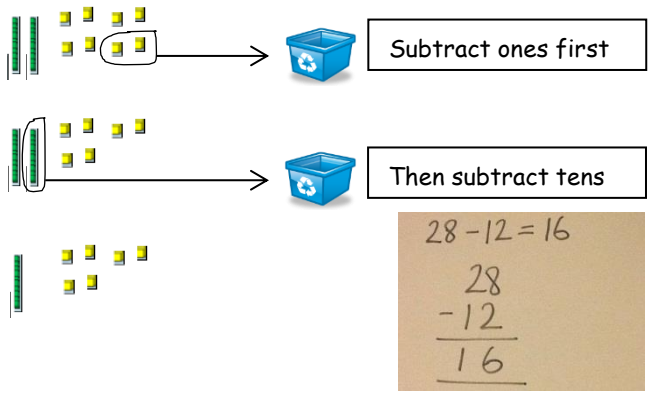
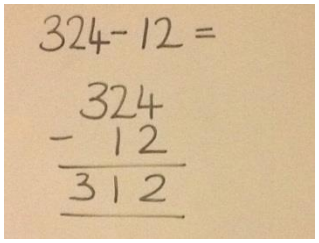
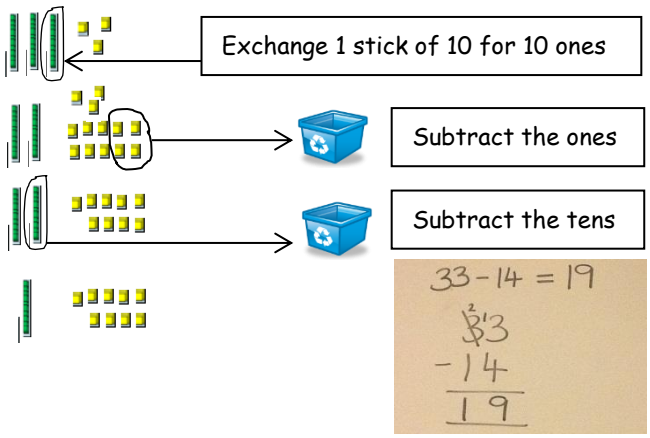
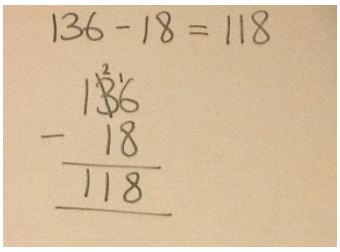
YEAR 2

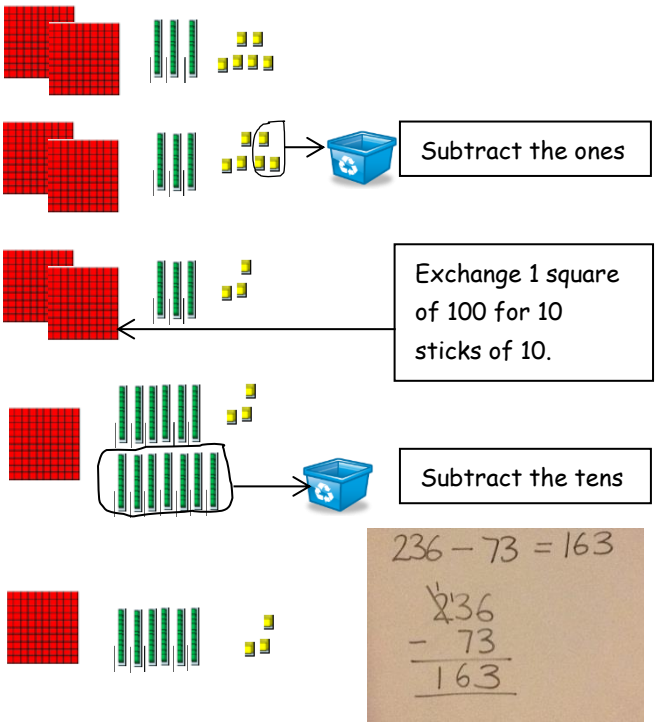
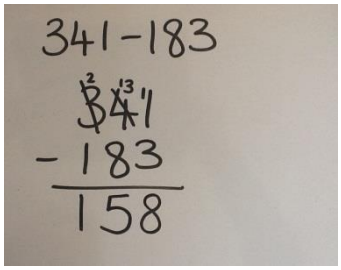
VOCABULARY: subtract, minus, leave, how many are left/left over?, how many less is… than…?, how much fewer is…?, difference between, half, halve, equals, sign, is the same as, partition, inverse, count on , count back, one less, ten less… one hundred less.

Method:	**Example/Representation:**
Children begin to set out TO - TO (that lie within the tens boundary) in columns. 28-12=	
Children begin to set out TO - TO (that cross the tens boundary) in columns using practical equipment, 33-14=	
Children continue to set out TO - TO (that cross the tens boundary) in columns by drawing pictorial representations.	
Children will solve one and two-step subtraction problems using concrete objects and pictorial representations including those involving number, quantities and measures.	Together Jack and Sam have £12. Jack has £2 more than Sam. How much money does Sam have? *A bar model can be very helpful in solving these types of problems.*  £12 – £2 = £10 £10 ÷ 2 = £5 Sam has £5

MENTAL STRATEGIES:

- To know that subtraction is the inverse of addition
- Use knowledge of inverse to check calculations and solve missing number problems
- Subtract numbers mentally, including:
  - subtracting ones from a 2-digit number
  - subtracting a multiple of 10 from a 2-digit number
  - subtracting a 2-digit number from another 2-digit number
- Recall and use subtraction facts to 20 fluently
- Use knowledge of number bonds to 100 (multiples of 10) to reason (40 + 60 = 100 so 100 – 60 = 40 and 100 – 40 = 60)

YEAR 3:	
VOCABULARY: leave, subtract, less, minus, column subtraction, inverse, decomposition, exchange, how many are left/left over?, difference between, how many more/fewer is… than…?, how much more/less is…?, Is the same as, equals, sign, multiples of tens and hundreds.	
Method:	**Example/Representation:**
Children continue to set out TO - TO (that lie within the tens boundary) in columns and record as column subtraction.	
Children begin to set out HTO - TO (that lie within the tens boundary) in columns and record as column subtraction.	
Children continue to set out TO - TO (that cross the tens boundary) in columns and record as column subtraction with decomposition.	
Children begin to set out HTO - TO (that cross the tens boundary) in columns and record as column subtraction with decomposition.	

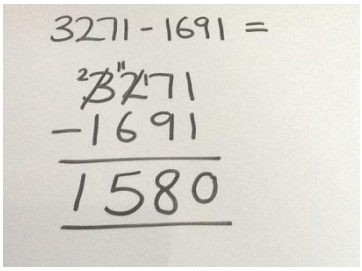
Children begin to set out HTO - TO (that cross the hundreds boundary) in columns and record as column subtraction with decomposition. (First with equipment and then without once secure)	
Children begin to set out HTO - HTO (that cross the hundreds and tens boundary) in columns and record as column subtraction with decomposition.	
Children will solve one and two-step subtraction problems (including missing number problems).	Fill in the missing number: 150 - ☐ = 87 15 + ☐ = 17+24

MENTAL STRATEGIES: Subtract numbers mentally, including:

- Subtracting a single digit number from a 3-digit number
- Subtracting a multiple of 10 from a 3-digit number
- Subtracting a multiple of 100 from a 3-digit number
- Estimate the answer to a calculation and use inverse operations to check answer

YEAR 4

VOCABULARY: subtract, subtraction, minus, *decrease,* leave, how many are left/left over?, difference between, how many more/fewer is… than…?, how much more/less is…?, Is the same as, equals, sign. Column subtraction, decomposition, exchange, multiples of thousand, inverse.

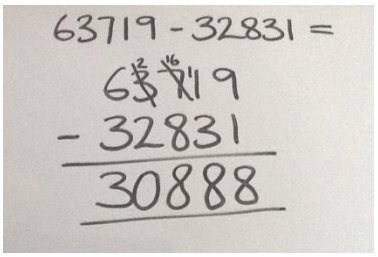
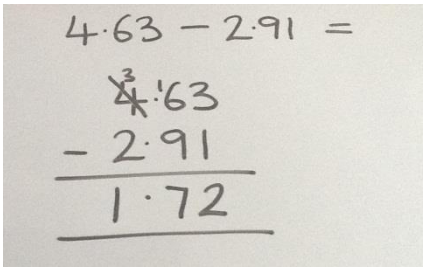
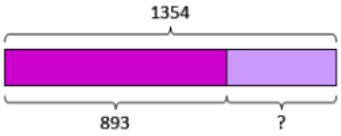
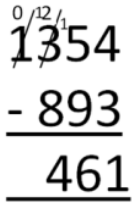
Method:	**Example/Representation:**
Children will subtraction numbers with up to 4-digits using the formal written method of column subtraction with decomposition.	
Solve two-step problems using formal jottings and explaining reasoning behind their choice of operation and calculations (Singapore Bar Method).	Lorenzo is looking over the photographs he took during his friend's wedding. He took a total of 3218 pictures but some of them were no good. 428 of them were blurred; he forgot the flash on 123 of them and could see part of his finger in 54 of them. How many pictures were good enough for him to put on a CD for his friend?

MENTAL STRATEGIES:

- Subtract numbers mentally, including:
- Subtracting multiples of one thousand from a 4-digit number
- Use of number pairs that total 1000 (multiples of 10) to calculate subtraction (e.g. 1000 – 300 = 700)
- Estimate the answer to a calculation and use inverse operations to check answers

YEAR 5

VOCABULARY: efficient written method, subtract, subtraction, minus, decrease, difference between, inverse, decimals, ones and tenths boundary, column subtraction, decomposition, exchange.

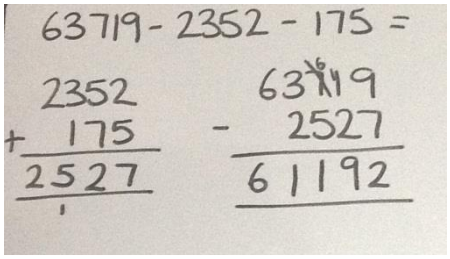
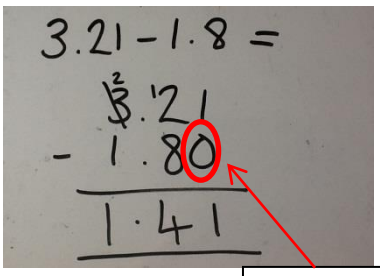
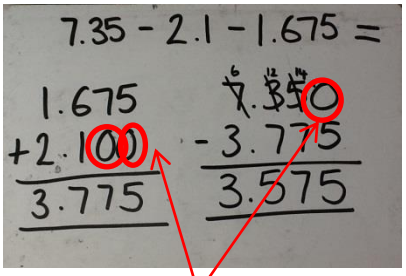
Method:	**Example/Representation:**
Children will subtract numbers with more than 4-digits using the formal written method of column subtraction with decomposition.	
Children will subtract decimal numbers with the same number of decimal places with decomposition.	
Solve multi-step problems using formal jottings and explaining reasoning behind their calculations.	There are 1354 seats in the cinema. 893 of the seats are full. How many are empty?  

MENTAL STRATEGIES:

- Subtract increasingly large numbers mentally (e.g. 12, 654 – 1,341 = 11, 213)
- Mentally subtract tenths (e.g. 0.7 - 0.5 = 0.2) and 1-digit whole numbers and tenths (8 - 0.3 = 7.7)
- Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

YEAR 6

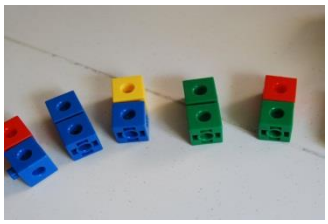
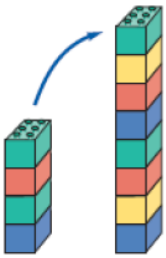
VOCABULARY: order of operations, subtract, decrease, difference, inverse, decimals, ones, tenths and hundredths boundary, column subtraction, decomposition, exchange.

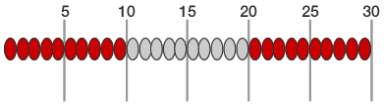
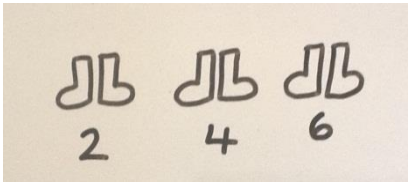
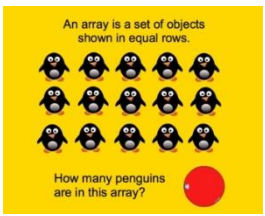
Method:	**Example/Representation:**
Children will subtract several numbers of increasing complexity and be taught to combine some of the numbers so that the subtraction can be completed.	
Children will subtract decimal numbers with a different number of decimal places with decomposition.	 Zero used as place holder
Children will subtract several decimals numbers with a different number of decimal places be taught to combine some of the numbers so that the subtraction can be completed.	 Zero used as place holder
Solve multi-step problems using formal jottings and explaining reasoning behind their calculations.	A shop sells boxes of chocolates. One box costs £3·99. A second box costs £2·60. A third box costs £6·45. What is the difference in price between the most and least expensive boxes?

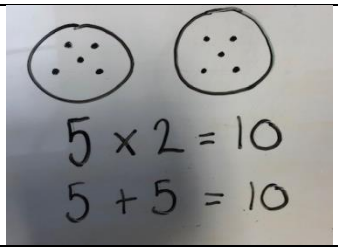
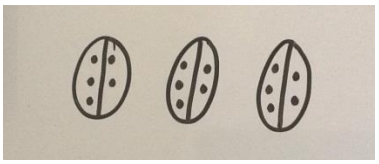
MENTAL STRATEGIES:

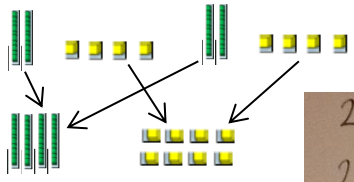
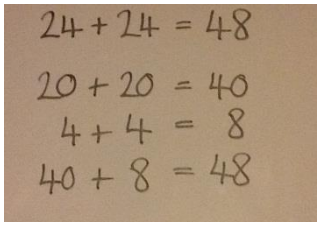
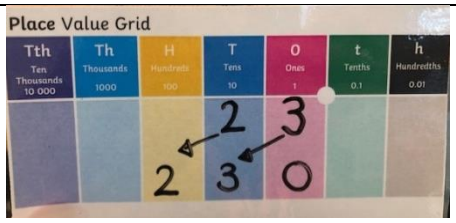
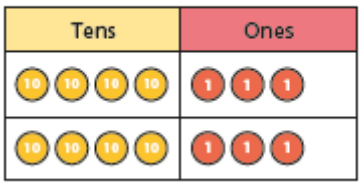
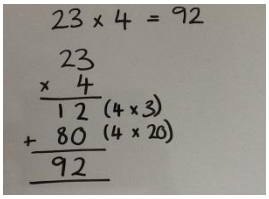
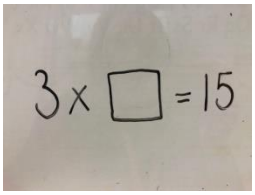
- Subtract increasingly large numbers mentally (e.g. 12, 654 – 1,341 = 11, 213)
- Subtract decimal numbers mentally (up to 2 decimal places)
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.

Multiplication

Brooke Hill Academy Trust CALCULATION POLICY	
MULTIPLICATION	
EYFS	
VOCABULARY: group, lots of, double	
Method	**Example/Representation**
Children will count groups of the same number of objects and add them together. The children learn about grouping in practical contexts and through pictorial representations.	Count groups of 2 and then count all objects to add them together. 
Children will solve simple problems involving doubling.	 Double 4 is 8
MENTAL STRATEGIES: - Develop a mental image of the number system. - Understand the value of a number - Counting in 2s, 5s and 10s. - Number patterns on a number line and on a hundred square – 2s, 5s and 10s.	

YEAR 1	
VOCABULARY: odd, even, count in twos, fives, count in tens (forwards from/backwards from), how many times? lots of, groups of, once, twice, five times, ten times , multiple of, times, multiply, multiply by, array, row, column, double.	
Method:	**Example/Representation:**
Children will count groups of the same number of objects and add them together. The children learn about grouping in practical contexts, through pictorial representation. Bead strings and counting sticks will be used to support counting in sequences of 2s, 5s and 10s.	1) I have 5 pairs of socks in the bag. How many socks are there? 
Children will recognise and complete patterns and sequences involving multiples of 2, 5 and 10.	
Children will be given one-step word problems to solve, involving counting in multiples of 2, 5 and 10 and doubles. Children will use concrete objects and pictorial representations to support their ideas.	Alfie, Joseph and Ben all have a pair of socks. How many socks are there altogether? 
Children will be introduced to an array to support multiplication	 5 + 5 + 5 = 15 5 x 3 = 15
MENTAL STRATEGIES: - Count forwards and backwards in multiples of 2s, 5s and 10s. - Recall doubles of numbers up to and including 10.	

YEAR 2	
VOCABULARY: odd, even, twos, fives, tens, threes, lots of, groups of, once, twice, three times, five times, ten times, multiple of, times, multiply, multiply by, repeated addition, array, row, column, double.	
Method:	**Example/Representation:**
Children will be able to recognise and write the multiplication symbol (x) in mathematical statements.	
Children will understand the operation of multiplication as repeated addition using a bead string or other practical resources to support this.	5 x 4 = 20 (5, 4 times) 
Children will use pictorial representations of groups to complete repeated addition and make links between repeated addition and multiplication.	
Children will be able to represent a multiplication calculation using an array and write the multiplication symbol within a number sentence. Children will also understand that multiplication can be carried out in any order (commutative).	 3 x 5 = 15 5 x 3 = 15
Children will solve one-step multiplication problems (including missing number problems) using concrete objects and pictorial representations.	I have 3 ladybirds with 5 spots each. How many spots do they have altogether? 
MENTAL STRATEGIES: - Count forwards and backwards in multiples of 3. - Know the 2, 5 and 10 times tables (in and out of order) - Recognise odd and even numbers	

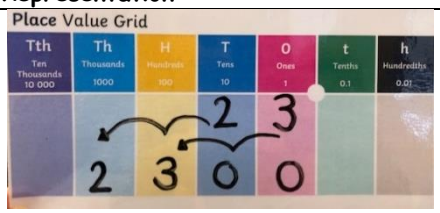
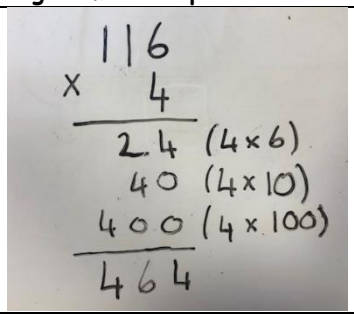
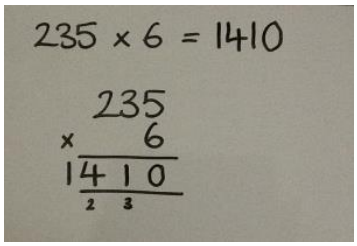
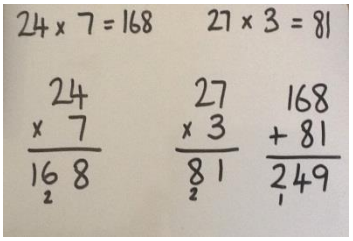
YEAR 3:	
VOCABULARY: multiply, times, groups of, equal groups of, multiple of, multiplied by, estimate, inverse, grid multiplication, expanded column multiplication, partition, commutative, associative, product.	
Method:	**Example/Representation:**
Children will learn to calculate doubles of 2-digit numbers through partitioning.	Double 24 = 24 + 24 = 48  
Children will learn to multiply whole numbers and those involving decimals by 10 by moving the digits around the fixed decimal on a place value grid.	 **23 x 10 = 230** **The digits move 1 space to the left.**
Children will be taught to multiply numbers TO X O through partitioning using practical resources.	Annie works out 43 x 2 = 86 
Children will be taught to multiply numbers (TO x O) using the formal written method of expanded column multiplication and make the link to grid method.	
Children will solve problems involving multiplication, including scaling and missing number problems.	Sam is planting onions in the vegetable plot in his garden. He arranges the onions into rows of 4 and has two left over. He then arranges them into rows of 3 and has none left over. How many onions might he have had? Explain your reasoning. 

MENTAL STRATEGIES:

- Count forwards and backwards in multiples of 4, 8, 50 & 100
- Know the 3, 4 and 8 times tables (in and out of order)
- Connect the 2, 4 and 8 times tables through doubling
- Use knowledge of place value to calculate multiplication (e.g. 2 x 2 = 4, 2 x 20 = 40, 2 x 200 = 400)

YEAR 4

VOCABULARY: multiply, multiplied by, product, short multiplication, partition, distributive law, commutative, groups of, multiply, times, multiples, inverse

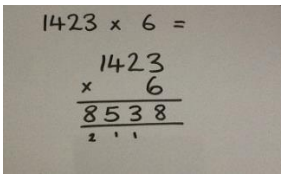
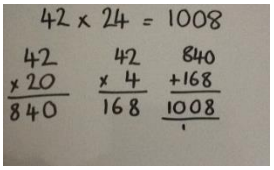
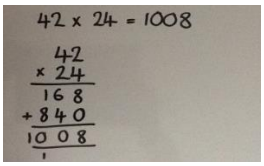
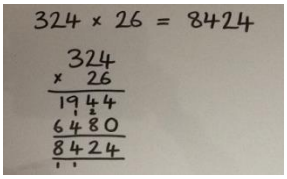
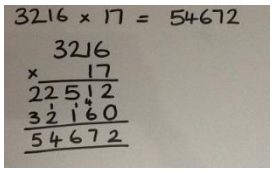
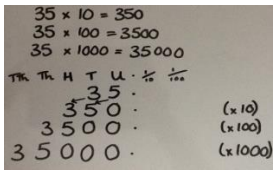
Method:	**Example/Representation:**
Children will learn to multiply whole numbers and those involving decimals by 10 and 100 by moving the digits around the fixed decimal on a place value grid.	 **23 x 100 = 2300** **The digits move 2 spaces to the left.**
Children will be taught to multiply numbers (HTO x O) using the formal written method of expanded column multiplication and make the link to grid method.	
Children will be taught to multiply numbers (HTO x O) using the formal written method of short multiplication and will link with the Distributive Law method.	
Solve problems involving scaling and multiplying and adding to multiply two or three-digit numbers by one digit.	Harriet has 7 friends who each have 24 apples. Joseph has 3 friends who each have 27 apples. How many apples do Harriet and Joseph's friends have altogether? 

MENTAL STRATEGIES:

- Know all times tables up to and including 12 x 12 (by the end of Year 4)
- Recognise and use factor pairs (e.g factor pairs for numbers up to and including 10)
- Know that TO x 5 is TO x 10 then divide by 2 (e.g 18 x 5 = (18 x 10) ÷ 2 = 90)
- Know that TO x 9 is TO x 10 then subtract TO (e.g 18 x 9 = (18 x 10) – 18 = 162)

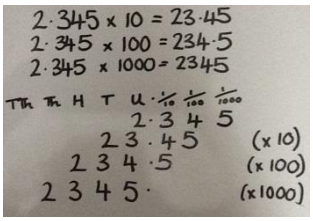
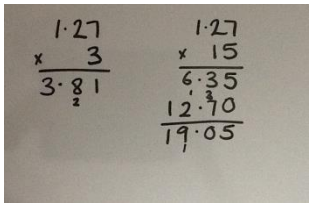
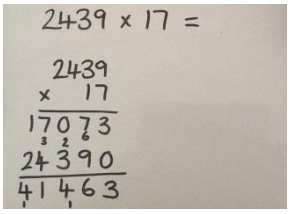
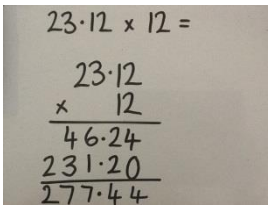
YEAR 5

VOCABULARY: composite numbers, prime number, prime factor, cube number, square number, derive, factor pairs, formal written method, times, multiply, multiplied by, multiple of, product, short multiplication, partition, long multiplication, scaling, decimal place, ones, tenths and hundreds.

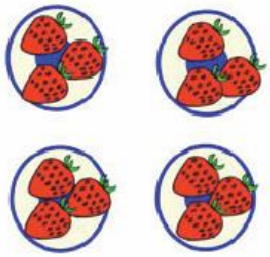
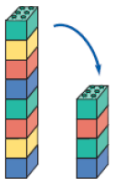
Method:	**Example/Representation:**
Children will be taught to multiply numbers (ThHTO x O) using the formal written method of short multiplication.	
Children will be taught to multiply numbers (TO x TO) by partitioning the second 2-digit number and using two short multiplications along with addition to solve the problem.	
Children will be taught to multiply numbers (TO x TO) using the formal written method of long multiplication.	
Children will be taught to multiply numbers (HTO x TO) using the formal written method of long multiplication.	
Children will be taught to multiply numbers (ThHTO x TO) using the formal written method of long multiplication.	
Children will learn to multiply whole numbers and those involving decimals by 10, 100 and 1000 by moving the digits around the fixed decimal on a place value grid.	
Children will solve problems involving multiplication, including scaling using factors, multiples, squared, cubed and prime numbers.	Alfie runs 3400m on Sports Day. His friend, Harry, runs three times as far. How far does Harry run?

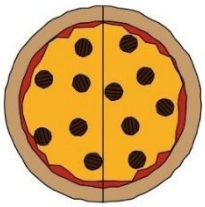
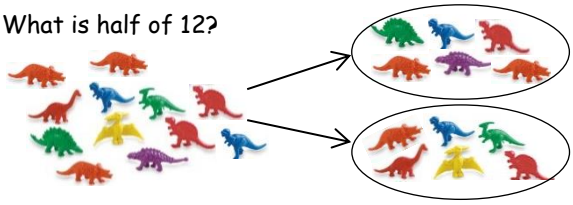
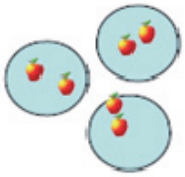
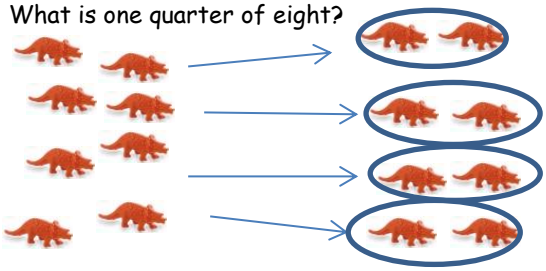
MENTAL STRATEGIES:

- Recognise and calculate factor pairs for any number
- Use times table knowledge to derive multiples of any number
- Establish whether a number is a prime number (up to 100) or a composite number (not prime) and recall prime numbers up to 19
- To know what a square number is and recall all square numbers (up to and including 144)
- To know what a cube number is and recall the first 5 cube numbers

YEAR 6	
VOCABULARY: common factors, multiples, prime, formal written method, multiply, multiplied by, multiple of, product, short and long multiplication, partition, scaling, decimal place, ones, tenths and hundredths.	
Method:	**Example/Representation:**
Multiply numbers by 10, 100 and 1000 where the answers are up to three decimal places.	
Multiply one-digit numbers with up to two decimal places by whole numbers using: - Short multiplication when multiplying by a single digit - Long multiplication when multiplying by a 2-digit number	
Multiply multi-digit numbers up to 4 digits by a 2-digit whole number using the formal written method of long multiplication.	 
MENTAL STRATEGIES: - Identify common factors, common multiples and prime numbers - Use common factors to simplify fractions mentally - Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy	

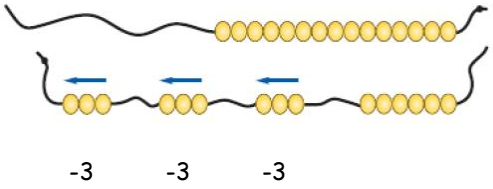
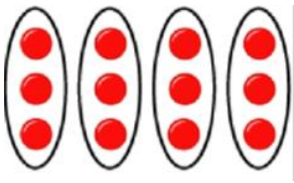
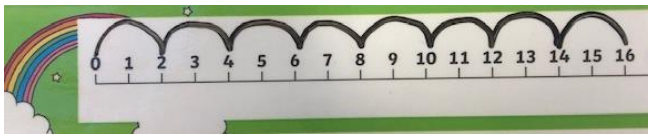
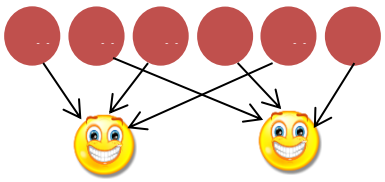
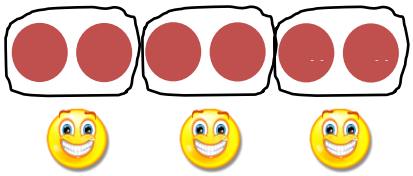
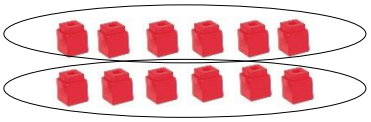
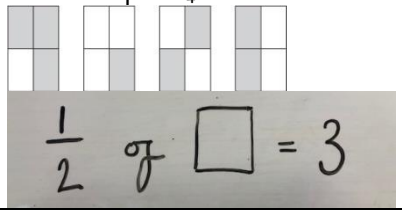
Division

Brooke Hill Academy Trust CALCULATION POLICY	
DIVISION	
EYFS	
VOCABULARY: halve, half, share, share equally, groups	
Method:	**Example/Representation:**
Children experience early division by sharing objects and counting how many in each group.	
Children will solve problems including halving and sharing.	 What is half of 8? Half of 8 is 4
MENTAL STRATEGIES: - Develop a mental image of the number system. - Understand the value of a number	

YEAR 1	
VOCABULARY: halve, share, share equally, groups, equal groups of, divide, divided by, left, left over	
Method	**Example/Representation:**
Children will understand how to share items out in play scenarios.	Share 12 cakes between 3 people equally: 
Children will understand grouping by putting objects into equal groups.	8 teddy bears put into two equal groups: 
Children will be taught to associate 'half' with dividing by two and recognise, find and name a half as one of two equal parts. Children will find half of shapes, objects and quantities.	Can you cut the pizza in half?  What is half of 12? 
Children will be given a word problem to complete either practically or using pictorial representations.	Can you share 6 apples between 3 plates? 
Children will be taught to associate 'quartering' with dividing by four and recognise, find and name a quarter as one of four equal parts. Children will find a quarter of shapes, objects and quantities.	Can you cut the pizza into quarters?  What is one quarter of eight? 
Children will recognise and write the division symbol (÷) in mathematical statements, calculating the answer with the teacher using concrete objects.	8 ÷ 2 = 4 
MENTAL STRATEGIES: - Count forwards and backwards in multiples of 2s, 5s and 10s. - Recall half of even numbers to about 10.	

YEAR 2

VOCABULARY: groups of, equal groups of, halve, share, share equally, divide, divided by, divided into, repeated subtraction, inverse

Method:	**Example/Representation:**
Children will understand the operation of division as grouping using repeated subtraction on a prepared number line.	15 ÷ 3 = 5  -3 -3 -3
Children will be able to represent a division calculation using an array and write the division within a number sentence.	How many groups of 3 are in 12? 12 ÷ 3 = 4 
Children will use a number line to carry out repeated subtraction to solve a division number sentence. They will use their knowledge of counting up in multiples to solve division calculations, recognising this is the inverse of multiplication.  3 6 9 12 15	16 ÷ 2 = 8  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Children will be taught to understand the difference between sharing and grouping. Children will also connect unit fractions to equal sharing and grouping.	If 6 sweets are shared between 2 people, how many do they get each?  Sharing If there are 6 sweets, how many people can have 2 sweets each?  Grouping
Children will solve one-step division problems (including missing number problems) using concrete objects and pictorial representations.	12 ÷ ☐ = 6 
Children will make links between their division and fractions knowledge to help them solve problems.	Which shape is ¼ shaded?  ½ of ☐ = 3

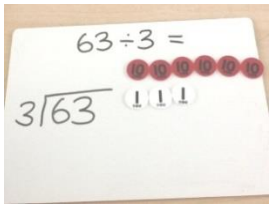
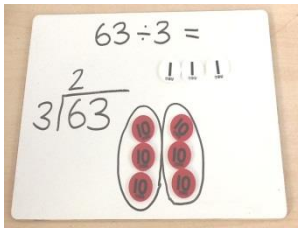
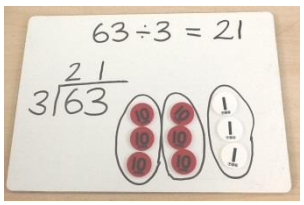
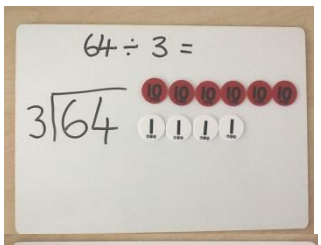
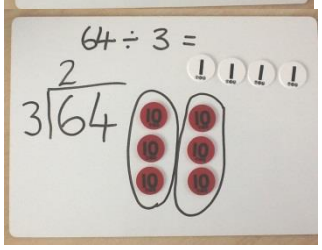
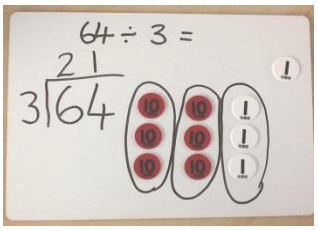
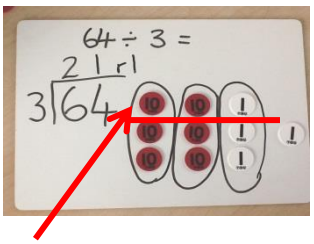
MENTAL STRATEGIES:

- To know that division is the inverse of multiplication
- Recall division facts for the 2, 5 and 10 times tables
- Recall halves for even numbers up to and including 20

YEAR 3:

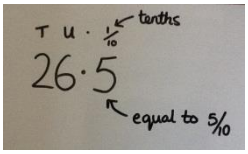
VOCABULARY: divided by, divide, divided into, grouping, divisor, short division, remainder, inverse

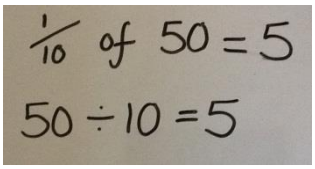
quotient
divisor) dividend

Method:	**Example/Representation:**
Children will use practical resources to support the short division (bus stop) method and will be encouraged to use multiples of the divisor to assist (TO ÷ O)	 Create the dividend using Place Value counters or dienes.  Group the tens counters according to the divisor and write the number of groups above the line in the tens column.  Group the ones counters according to the divisor and write the number of groups above the line in the ones column. The quotient can be seen across the groups.
Children will use practical resources to support solving division number sentences with remainders (TO ÷ O)	 Create the dividend using Place Value counters.  Starting with tens counters, group them according to the divisor. Write the number of groups in the tens column above the line.  Next, group the ones according to the divisor and arrange next to the groups of ten. Write the number of groups above the line in the ones column.  Any counters that cannot be grouped are the remainder. Write this at the end as 'r1'. As you look across each group, the quotient can be seen.

Pupils connect tenths to place value, decimal measures and that tenths is to divide by 10.

$\frac{1}{10}$





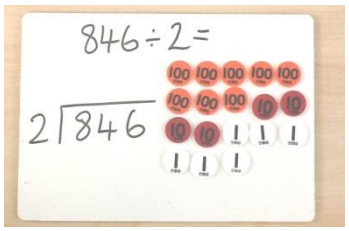
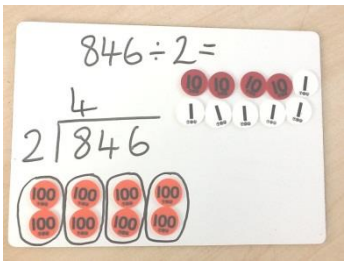
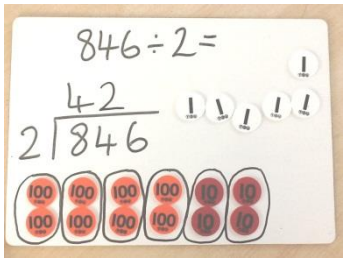
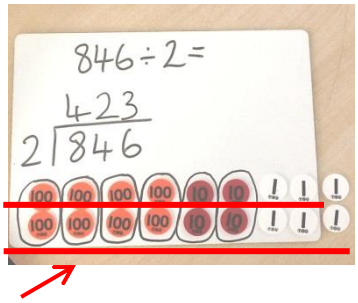
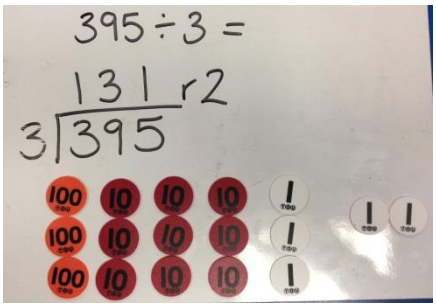
MENTAL STRATEGIES:

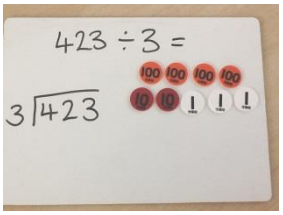
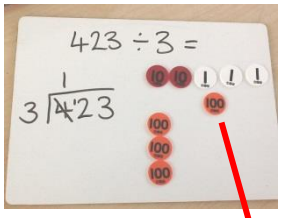
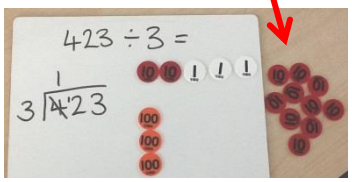
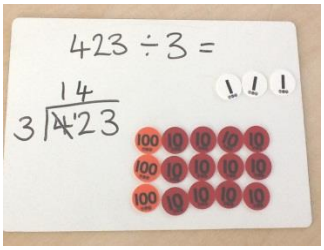
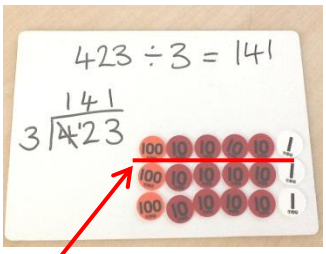
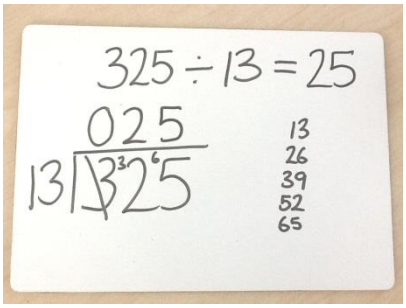
- Know the division facts from the 3, 4 and 8 times tables
- Use knowledge of place value to calculate division (e.g. 14 ÷ 2 = 7, 140 ÷ 2 = 70, 1400 ÷ 2 = 700)

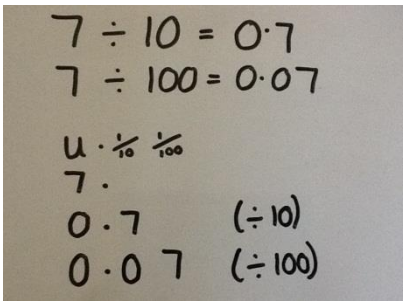
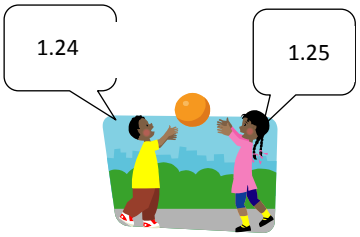
YEAR 4:

VOCABULARY: factor, divisor, divided by, divided into, remainders, divisible by, equivalent, short division, derive, Quotient, inverse, remainder, multiples, exchange

quotient
divisor) dividend

Method:	**Example/Representation:**
Children will use practical resources to support the short division method and will be encouraged to use multiples of the divisor to assist (HTO ÷ O)	 Create the dividend using Place Value counters.  Group the 100s counters according to the divisor. Write the number of groups above the line in the hundreds column.  Next, group the 10s counters according to the divisor. Write the number of groups above the line in the tens column.  Next, group the ones counters according to the divisor. Write the number of groups above the line in the ones column. The quotient can be seen across the groups.
Children will use practical resources to support solving division number sentences with remainders (HTO ÷ O)	

Children will use practical resources to support the short division method where exchange across place value columns occurs. (HTO ÷ O)	 Create the dividend using Place Value counters.  Group the hundreds counters according to the divisor. Write the number of groups above the line in the hundreds column.  Exchange the left over 100s counter for ten 10s counters and represent this beneath the line in the tens column.  Next, group the 10s counters according to the divisor and write the number of groups above the line in the tens column.  Group the ones counters according to the divisor and write the number of groups above the line in the ones column. The quotient can be seen across each group.
Children will use the short division method where exchange across the place value columns occurs. Pupils will be encouraged to use multiples of the divisor to assist (HTO ÷ TO).	

Find the effect of dividing a 1 or 2-digit number by 10 and 100; identifying the value of the digits in the answer as ones, tenths and hundredths.	
Count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten.	 What should I cut my pizza into if I have 100 people to serve? 

MENTAL STRATEGIES:

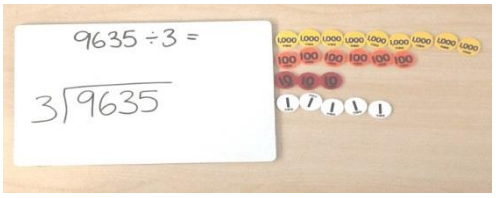
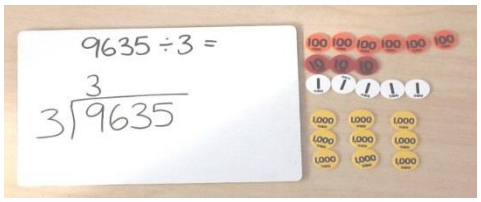
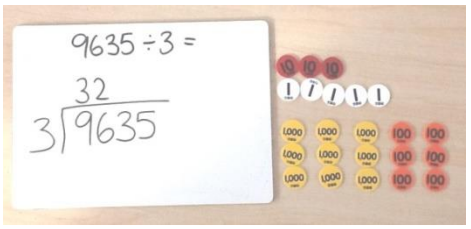
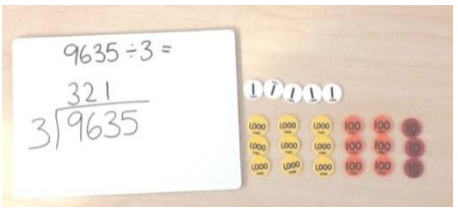
- Know all related division facts for all times tables up to 12 times table (by the end of Year 4)

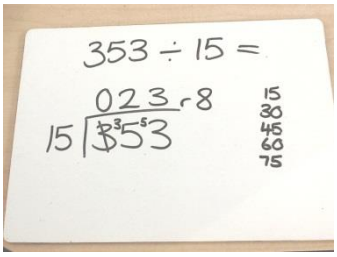
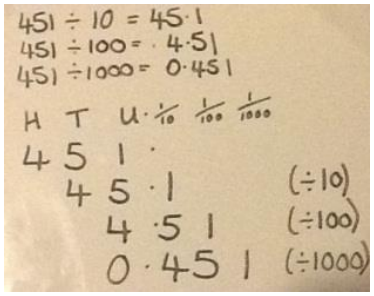
YEAR 5

VOCABULARY: divide, divided by, divided into, divisible by, remainder, quotient, inverse, decomposing, factor, decimal place, ones, tenths, scaling, short division

quotient
divisor) dividend

USEFUL VIDEOS:

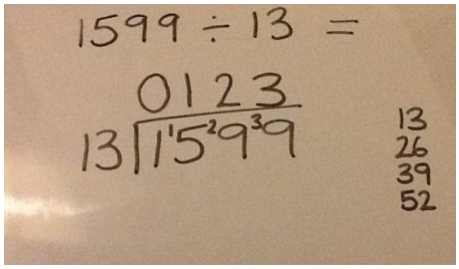
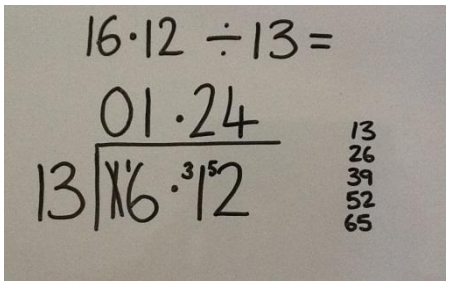
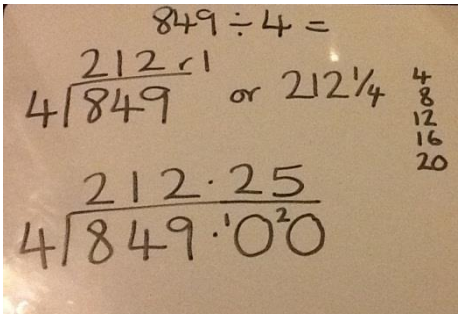
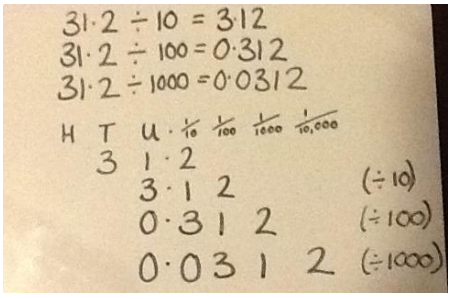
Method:	**Example/Representation:**
Children will use practical resources to support solving division number sentences with remainders (ThHTO ÷ O)	 Create the dividend using Place Value counters.  Group the 1000s counters according to the divisor and write the number of groups above the line in the thousands column.  Group the 100s counters according to the divisor and write the number of groups above the line in the hundreds column.  Group the 10s counters according to the divisor and write the number of groups above the line in the tens column.  Group the ones counters according to the divisor and write the number of groups above the line in the ones column. Express remainders as 'r2' as part of the quotient.

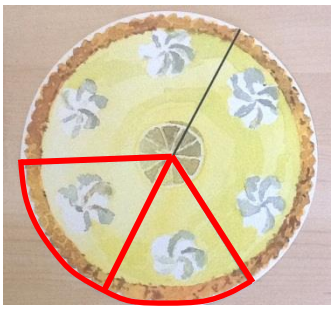
Children will use short division to solve division number sentences with remainders (HTO ÷ TO)	
Children will learn to divide whole numbers and those involving decimals by 10, 100 and 1000 by moving the digits around the fixed decimal.	
Children will solve problems involving division, including scaling.	***Problem:*** A batch of cookies calls for $\frac{3}{4}$ cup of sugar. How much sugar is needed for $\frac{1}{2}$ batch of cookies? Do you scale up or scale down to solve the problem? What is the scaling factor? ***Solution:*** $\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$ cup of sugar is needed for $\frac{1}{2}$ batch of cookies. You are scaling down because you are multiplying by a number less than 1. The scaling factor is $\frac{1}{2}$. ***Scaling down***
MENTAL STRATEGIES: - Multiply and divide numbers mentally drawing upon known facts - Continue to associate fractions with division	

YEAR 6

VOCABULARY: divide, divided by, divided into, divisible by, remainder, factor, quotient, inverse, decimal place, ones, tenths, hundredths, scaling, formal written methods.

quotient
divisor) dividend

Method:	**Example/Representation:**
Divide numbers up to 4 digits by a two-digit whole number using the formal written method of division.	 
Interpret remainders as whole number remainders, fractions or decimals.	
Children will now begin to explore the use of long division for 2 digit divisors which include remainders. Children will begin to interpret remainders as whole number remainders, fractions, decimals or by rounding, as appropriate for the context.	1 x 15 = 15 2 x 15 = 30 4 x 15 = 60 8 x 15 = 120 10 x 15 = 150 20 x 15 = 300 28 r12 15 | 432 - 300 (20 x 15) 132 - 120 (8 x 15) 12 12/15 28 15 | 432 - 300 (20 x 15) 132 - 120 (8 x 15) 12 4/5 28 15 | 432 - 300 (20 x 15) 132 - 120 (8 x 15) 12
Divide decimal numbers with up to 3 decimal places by 10, 100 and 1000 by moving the digits around a fixed decimal.	

Divide proper fractions by whole numbers	$^{1}/_{3} \div 2 = {}^{1}/_{6}$ 

MENTAL STRATEGIES:

- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
- Calculate a fraction of an amount