Calculation Policy

To be reviewed June 2025

Reviewed June 2023

Reviewed June 2021

Written June 2020

At West Felton CofE Primary School we believe that children should be introduced to the processes 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, recording 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 that they cannot do in their heads they use an efficient written method accurately and with confidence. It is important children acquire secure mental methods of calculation and one efficient written method of calculation for addition, subtraction, multiplication and division which they know they can rely on when mental methods are not appropriate.

This document identifies progression in calculation strategies rather than specifying which method should be taught in a particular year group.

Children will move on to the next stage when:
1) they are ready.
2) they are confident.

By the end of Year 6, children should be able to choose the most appropriate approach to solve a problem: making a choice between using jottings (an extended written method), an efficient written method or a mental method.

This policy contains the key pencil and paper procedures that will be taught within our school alongside practical resources. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement.

Reviewed 07/06/23

Addition

EYFS – Reception

Children at the expected level of development will:

-Have a deep understanding of number to 10, including the composition of each number

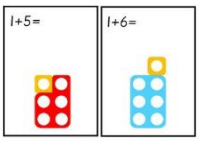
-Subitise (recognise quantities without counting) up to 5

-Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

-Verbally count beyond 20, recognising the pattern of the counting system; -

-Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity

Key Vocabulary:	**Key Resources:**
add, more, and, make, sum, total, altogether, double, one more, two more, ten more…, subitize, how many more to make… ?, how many more is… than…?	Physical/ concrete counting objects, number lines, Numicon, tens frame, Numberblocks
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 strawberries on a plate and 2 more are added, how many altogether? 
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:  2 + 5 = 7
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 + 1 = 6
Diagrams like can be used as an early introduction to a number line. This will help children develop their understanding of addition.	

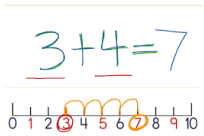
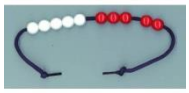
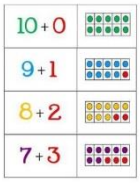
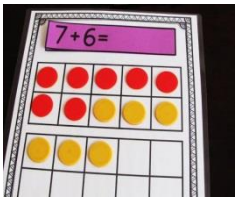
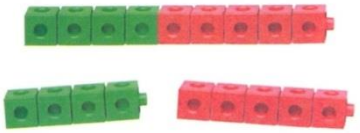
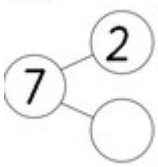
Children can instantly recognise the value of a number with the Numicon shape, they can add the vale of each piece to find the total.	 
Mental Strategies: - Develop a mental image of the number system. - Understand the value of a number - Counting forwards and backwards - Recall of number bonds to 10	

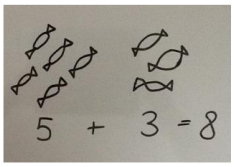
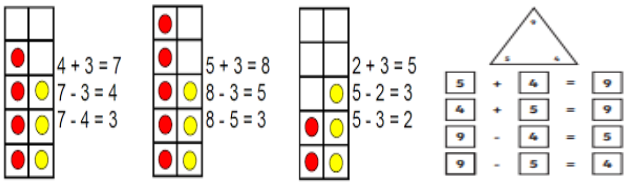
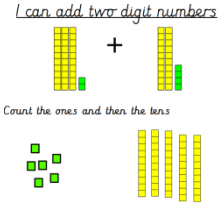
Addition

Year 1:

-read, write and interpret mathematical statements involving addition (+),and equals (=) signs
- represent and use number bonds and related addition facts within 20
- add one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 7 = 2 + ___

Key Vocabulary:	**Key Resources:**
number bonds, add, more, plus, make, sum, total, altogether, inverse, near double, equals, missing number, is the same as (including equals sign), parts and wholes, one more, two more… ten more, how many more to make…?, how many more is… than…?, how much more is…?	Tens frame, number line and squares, counting equipment e.g. cubes and counters, bead strings and Diennes/ Base 10.

Method: (Continuing to build on from previous years)	**Example/ Representation:** (Continuing to build on from previous years)
Children will be taught to use a number line to support addition. Children will be taught how to solve simple addition stories with the support of a 100 number square. Encourage children to draw their own number line and make their own marks.	 
Bead strings will be used to support addition.	5 + 3 = 8 
Children will use a tens frame to support addition, learn number bonds and near number facts including regrouping.	 
Use a range of practical resources to solve addition.	4 + 5 = 9 
Children will use the part whole model to add two numbers together. Children will use the part whole model to find missing numbers.	 

Children will solve one-step addition problems using concrete objects and/or pictorial representations. Children will use 'story' to help solve word problems and additions.	I have 5 sweets and my brother gives me 3 more, how many do I have altogther? 
Children will begin to learn the inverse relationship between addition and subtraction using tens frames and fact families.	
Children will begin to understand the place value of two-digit numbers through partitioning and regrouping.	

Mental Strategies:

- Know addition can be carried out in any order (commutative)
- Add 1 and 2 digit numbers to 20 including 0
- Number bonds to 20 related number facts
- Adding 10 to a single digit number
- Identify 1 more than a given number

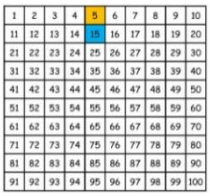
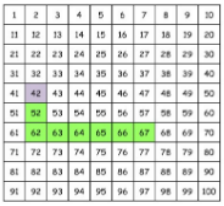
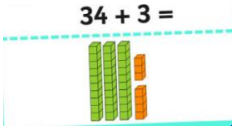
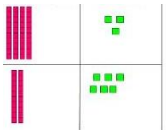
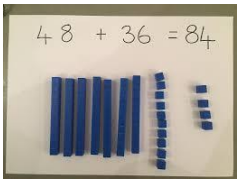
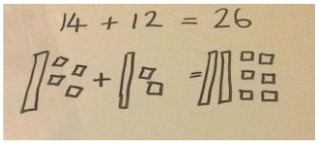
Addition

Year 2:

-solve problems with addition:
- -using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- -applying their increasing knowledge of mental and written methods

-recall and use addition facts to 20 fluently, and derive and use related facts up to 100

-add numbers using concrete objects, pictorial representations, and mentally, including:
- -a two-digit number and ones
- -a two-digit number and tens
- -two two-digit numbers
- -adding three one-digit numbers
- - show that addition of two numbers can be done in any order (commutative)
- -recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Key Vocabulary:	**Key Resources:**
number bonds, add, more, plus, make, sum, total, altogether, inverse, near double, equals, missing number, is the same as (including equals sign), parts and wholes, one more, two more… ten more, tens and ones (units), multiples, how many more to make…?, how many more is… than…?, how much more is…?	Tens frame, number line and squares, counting equipment e.g. cubes and counters, bead strings and Diennes/ Base 10.
Method: **(Continuing to build on from previous years)**	**Example/ Representation:** **(Continuing to build on from previous years)**
Children will use the hundred square to add multiples of 10 and near multiples understanding the place value.	 
Children will count on and use known number facts to solve 2-digit and 1-digit addition, addition of 3 numbers and 10 or near multiple. 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.	Children will begin to partition the tens and ones.   T = 30 O = 4 + 3 =7 = 37
Children will partition numbers into tens and ones using concrete objects to support written column method. (not crossing the tens). Children will partition numbers into tens and ones using concrete objects to support written column method. (crossing the tens and into the hundreds).	 43 + 26 _____  4 8 + 3 6 _____ 8 4 _____ 1
Children will solve simple addition problems using concrete objects and pictorial representations, including those involving number, quantities and measures.	George has 14 strawberries and Jess has 12 strawberries. How many strawberries are there altogether? 

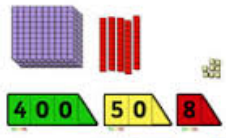
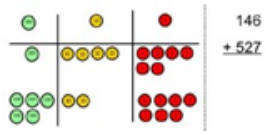
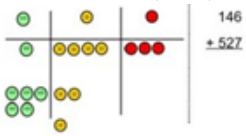
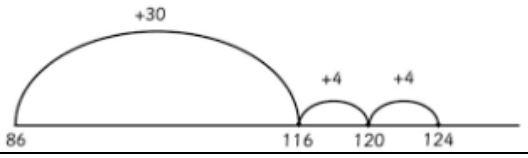
Mental Strategies:

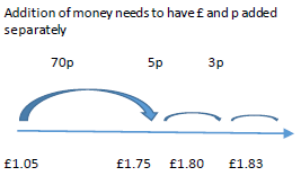
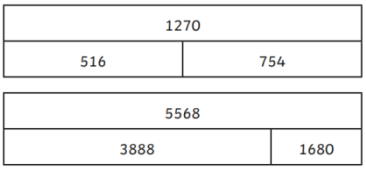
-Know that addition is the inverse of subtraction

-Add numbers mentally, including: a 2-digit number and units, a multiple of 10 to a 2-digit number, two 2-digit numbers, three 1-digit numbers.

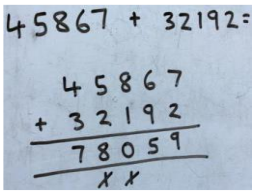
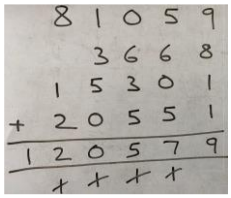
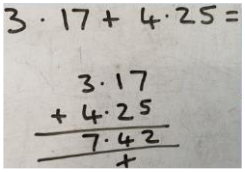
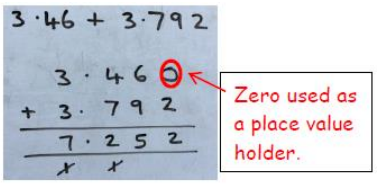
- Use knowledge of inverse to check calculations and solve missing number problems
- Use knowledge of number bonds to 10 to calculate numbers bonds to 100
- Count on in tens from any given number (e.g 19 – 29 – 39 – 49 etc).

Addition
Lower Key Stage 2

Year 3:	**Year 4:**
-add numbers mentally, including: -a three-digit number and ones -a three-digit number and tens -a three-digit number and hundreds -add numbers with up to three digits, using formal written methods of columnar addition -estimate the answer to a calculation and use inverse operations to check answers -solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	-add numbers with up to 4 digits using the formal written methods of columnar -estimate and use inverse operations to check answers to a calculation -solve addition two-step problems in contexts, deciding which operations and methods to use and why
Key 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	**Key Resources:** Dienes/ base ten, number lines, number squares, place value cards, grids and counters, bar model, money.
Method: **(Continuing to build on from previous years)**	**Example/ Representation:** **(Continuing to build on from previous years)**
Children will continue to reinforce place value through partitioning, using practical equipment to support the process of addition.	
Children will use place value counters/ Dienes to aid addition with or without regrouping. Children will use the place value grids to add together the value.	Make both numbers on the place value grid.  Collate the ones (units) to make another ten. 
Children will use number lines to add with partitioning, starting with the larger number and making jumps in tens and ones values.	38 + 86 = 124 
Children will use various written methods for addition with or without regrouping. Children can use expanded column addition. Children can use column addition with carrying the value for bridging ten.	146+ 527 = 100 + 40 + 6 500 + 20 + 7 600 + 70 + 3 = 673 146 + 527 13 60 600 673 146 +527 673 1

As children move onto the addition of money, decimal places will need to be introduced as well as recording pounds and pence value.	£ . p 1.05 + 0.78 £1.83 1 
Bar models can be used to solve missing numbers and word problems.	

Addition
Upper Key Stage 2

Year 5:	**Year 6:**
-add whole numbers with more than 4 digits, including using formal written methods (columnar addition) -add numbers mentally with increasingly large numbers -use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy -solve addition multi-step problems in contexts, deciding which operations and methods to use and why.	-perform mental calculations, including with mixed operations and large numbers -use their knowledge of the order of operations to carry out calculations involving the four operations -solve addition multi-step problems in contexts, deciding which operations and methods to use and why
Key Vocabulary: order of operations, column addition, add, in total, answer, tens boundary, hundreds boundary, thousands boundary, millions boundary, units boundary, tenths boundary, hundredths boundary, decimal place, inverse.	**Key Resources:** Dienes/ base ten, number lines, number squares, place value cards, grids and counters, bar model, money, calculators.
Method: **(Continuing to build on from previous years)**	**Example/ Representation:** **(Continuing to build on from previous years)**
Children will add numbers with more than 4-digits using the formal written method of column addition, including adding several numbers.	 
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.	 
Our aim is that, by the end of Y6, children use mental methods (with jottings) when appropriate, but for other calculations, they use an efficient, formal written method accurately and with confidence.	

Subtraction

EYFS - Reception

Children at the expected level of development will:

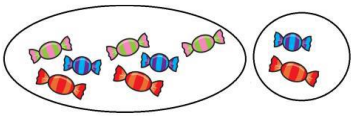
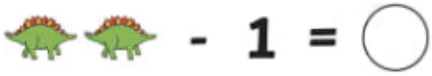
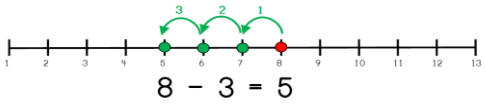
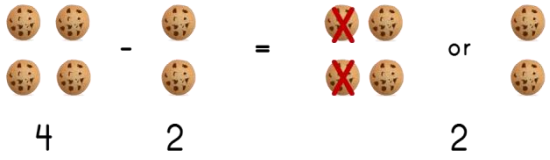
-Have a deep understanding of number to 10, including the composition of each number

-Subitise (recognise quantities without counting) up to 5

-Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

-Verbally count beyond 20, recognising the pattern of the counting system

-Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity

Key Vocabulary:	**Key Resources:**
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, subitize	Physical/ concrete counting objects, number lines, Numicon, tens frame, Numberblocks
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 9 sweets and I ate 2. How many have I got left? 
Children are introduced to the addition symbol (-) and use pictures/ diagrams to represent the calculation.	
Children will use a number line/ early diagrams to support counting back for subtraction.	
Children can use physical counting objects or fingers to complete a subtraction. Children can join in number stories to support subtraction.	
Children will create marks (jottings) and physically cross out to find the answer.	
Using fingers to support counting back, putting the large number in your head and curl the fingers up/ bend down for how many you're taking away.	5 – 2 = Children will put 5 in their head (larger number). Fold down 2 fingers, count how many are left. 

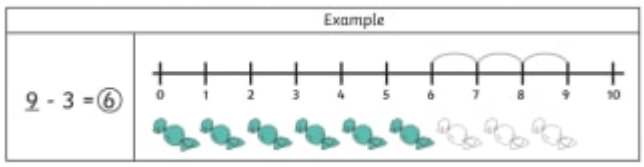
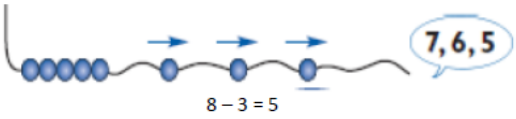
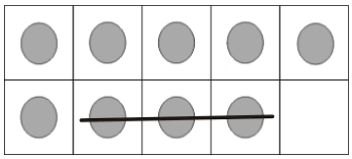
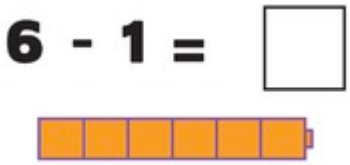
Children, using the shape pattern, will identify subtraction as removing a segment.	
Mental Strategies: - Develop a mental image of the number system - Children count backwards using familiar number rhymes (e.g '10 Green Bottles', '5 Fat Sausages') - Count backwards from different starting points	

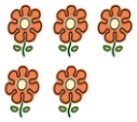
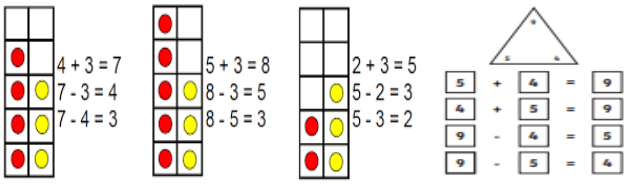
Subtraction

Year 1:

-read, write and interpret mathematical statements involving subtraction (-),and equals (=) signs
- represent and use number bonds and related addition facts within 20
- add one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 7 = 2 + ___

Key Vocabulary:	**Key Resources:**
subtract, take away, minus, leave, how many fewer is…than..?, how much less is..?, 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..?	Tens frame, number line and squares, counting equipment e.g. cubes and counters, bead strings and Diennes/ Base 10.

Method: (Continuing to build on from previous years)	**Example/ Representation:** (Continuing to build on from previous years)
Children will be taught to use a number line to support subtraction. Children will be taught how to solve simple subtraction stories with the support of a 100 number square. Encourage children to draw their own number line and make their own marks.	
Bead strings will be used to support subtraction.	
Children will use a tens frame to support subtraction, learn number bonds and near number facts including regrouping.	8 - 3 = 
Use a range of practical resources to solve take aways.	 Take the 1 cube away, count how many remain.
Children will use the part whole model to subtract two numbers together. Children will use the part whole model to find missing numbers.	 

Children will solve one-step subtraction problems using concrete objects and/or pictorial representations. Children will use 'story' to help solve word problems.	I had 5 flowers but 3 died. How may were still growing?  5 - 3 =
Children will begin to learn the inverse relationship between addition and subtraction using tens frames and fact families.	
Mental Strategies: - Subtract 1 and 2 digit numbers to 20 including 0 - 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)	

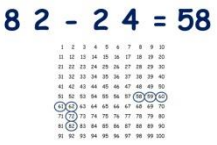
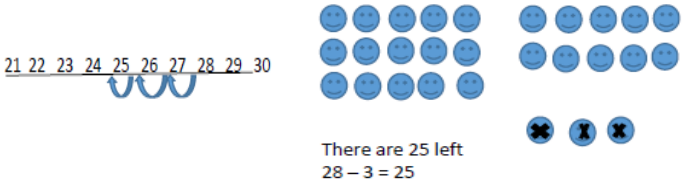
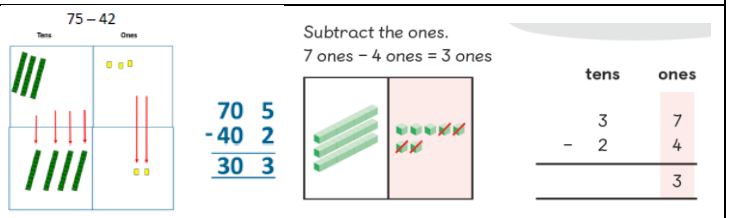
Subtraction

Year 2:

-solve problems with subtraction:
- -using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- -applying their increasing knowledge of mental and written methods

-recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100

-subtract numbers using concrete objects, pictorial representations, and mentally, including:
- -a two-digit number and ones
- -a two-digit number and tens
- -two two-digit numbers
- -know that subtraction of one number from another cannot be done in any order unlike addition.
- -recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

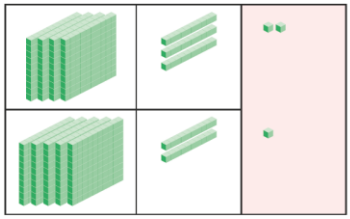
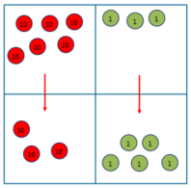
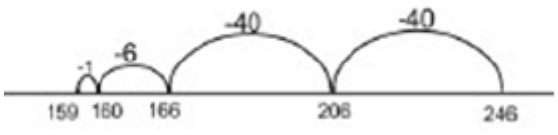
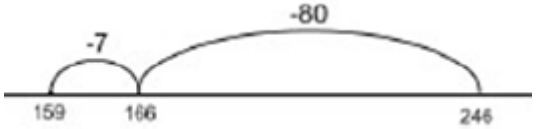
Key Vocabulary:	**Key Resources:**
subtract, minus, leave, how many are left/left over?, how many less is… than…?, how much fewer is…?, difference between, half, halve, equals, sign, is the same as, partition, inverse, count on, count back, one less, ten less… one hundred less.	Tens frame, number line and squares, counting equipment e.g. cubes and counters, bead strings and Diennes/ Base 10.
Method: **(Continuing to build on from previous years)**	**Example/ Representation:** **(Continuing to build on from previous years)**
Children will use the hundred square to subtract multiplies of 10 and near multiples understanding the place value.	
Children will count back and use known number facts to solve 2-digit and 1-digit subtraction and 10s or near multiples. Children will use concrete objects and pictorial representations to subtract: a 2- digit number and ones, and a 2-digit number and multiples of 10.	
Children will partition numbers into tens and ones using concrete objects to support written column method. (not crossing the tens). Children will partition numbers into tens and ones using concrete objects to support written column method. (crossing the tens and into the hundreds).	
Children will solve simple problems using concrete objects and pictorial representations, including those involving number, quantities and measures.	

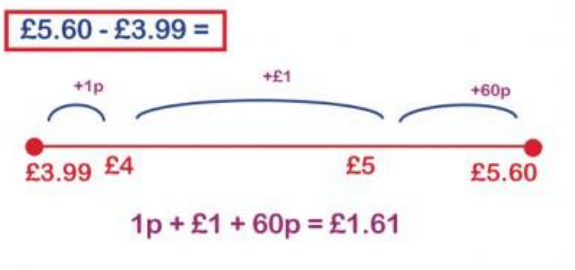
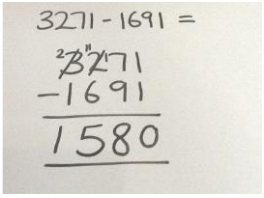
Mental Strategies:

- 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 units 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)

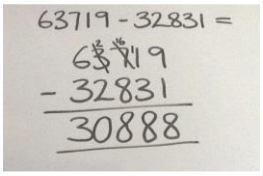
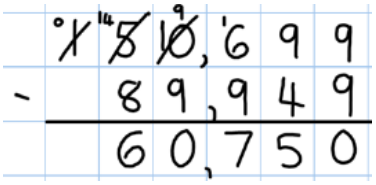
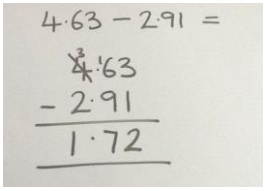
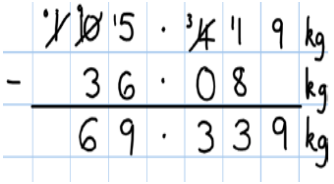
Subtraction

Lower Key Stage 2

Year 3:	**Year 4:**
-subtract numbers mentally, including: -a three-digit number and ones -a three-digit number and tens -a three-digit number and hundreds -subtract numbers with up to three digits, using formal written methods of columnar subtraction -estimate the answer to a calculation and use inverse operations to check answers -solve problems, including missing number problems, using number facts, place value, and more complex subtraction.	-subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate. -estimate and use inverse operations to check answers to a calculation -solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.
Key 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.	**Key Resources:** Dienes/ base ten, number lines, number squares, place value cards, grids and counters, bar model, money.
Method: **(Continuing to build on from previous years)**	**Example/ Representation:** **(Continuing to build on from previous years)**
Children will continue to subtract using concrete objects to support subtraction such as Dienes/ Base 10 and Place Value Counters when there is no regrouping.	 h t o 4 3 2 + 5 2 1 3  90 8 - 30 5 60 3
Children can continue to make jumps backwards using number lines and partitioning the take away amount into tens and ones.	E.g. 246-87=  Building confidnece for larger jumps: 

Alternatively, children can use the number line to jump up to find the difference.	
Children will use the expanded method and partition the second number into their place value to subtract.	237 – 112 = 237 = 237 – 100 = 137 = 137 – 10 = 127 = 127 – 2 = 125 237 -112 5 20 100 125
Children will subtract numbers with up to 4-digits using the formal written method of column subtraction with decomposition.	

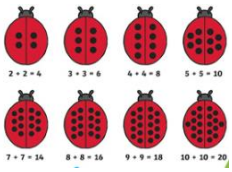
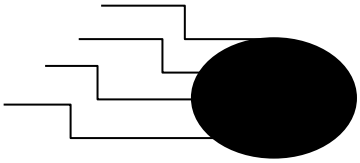
Subtraction
Upper Key Stage 2

Year 5:	**Year 6:**
-subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) -subtract numbers mentally with increasingly large numbers -use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy -solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	-perform mental calculations, including with mixed operations and large numbers -use their knowledge of the order of operations to carry out calculations involving the four operations -solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why
Key Vocabulary: efficient written method, subtract, subtraction, minus, decrease, difference between, inverse, decimals, units and tenths boundary, column subtraction, decomposition, exchange.	**Key Resources:** Dienes/ base ten, number lines, number squares, place value cards, grids and counters, bar model, money, calculators.
Method: **(Continuing to build on from previous years)**	**Example/ Representation:** **(Continuing to build on from previous years)**
Children will subtract numbers with more than 4-digits using the formal written method of column subtraction with decomposition (borrowing).	 
Children will subtract decimal numbers with the same number of decimal places with decomposition (borrowing).	  *Empty decimal places can be filled with a zero to show the place value.*

Our aim is that, by the end of Y6, children use mental methods (with jottings) when appropriate, but for other calculations, they use an efficient, formal written method accurately and with confidence.

Multiplication

EYFS - Reception:
-Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Key Vocabulary:	**Key Resources:**
Double, the same as, equal groups.	Physical counting objects, picture representations.
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.	 
Children will solve simple problems involving doubling.	Double the spider legs. 
Children use songs, games and real life contexts to count in repeated groups of the same size. (2s, 10s)	

Mental Strategies:
- Develop a mental image of the number system.
- Understand the value of a number
- Counting in 2s, 5s and 10s.

Multiplication

Key Stage 1 – Year 1 and Year 2:

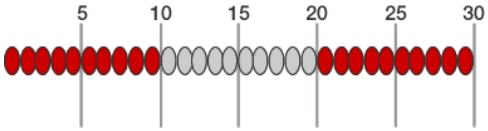
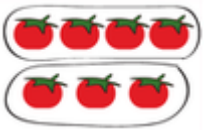
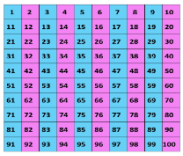
Year 1: solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Year 2: recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

-calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

-show that multiplication of two numbers can be done in any order (commutative)

-solve problems involving multiplication, using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts.

Key Vocabulary:	**Key Resources:**
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, double, repeated addition.	Physical counting objects, picture representations.
Method: **(building on from previous years)**	**Example/ Representation:** **(building on from previous years)**
Children will count groups of the same number of objects and add them together or use mental knowledge counting in steps of 2s, 5s and 10s. The children learn about grouping in practical contexts, through pictorial representation.	Can you make the cubes into towers of 2? Put the teddy bears into groups of 3.  
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 count repeated groups of the same size in practical contexts to understand multiplication as repeated addition.	 2 groups of 10 =20 10+10=20 Double 10 is 20. 10 groups of 2 =20 2+2+2+2+2+2+2+2+2+2=20
Doubling - Use concrete and pictorial representations to calculate doubles to 10 (Year 1) and 20 (Year 2).	 'double 2 is 4' 2 + 2 = 4 or 4 = 2 + 2
Children will use physical objects to share and recognise patterns when recognising odd and even numbers.	Children understand groups need to be equal.  

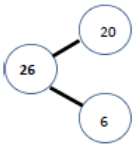
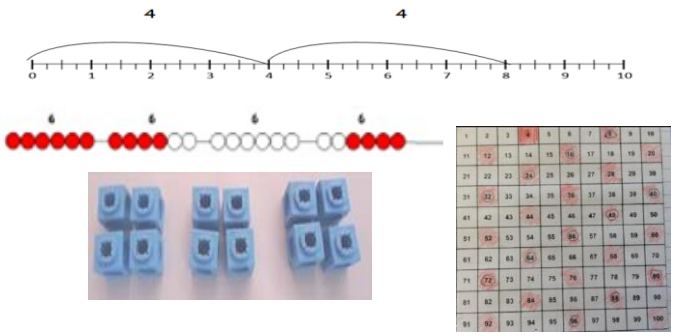
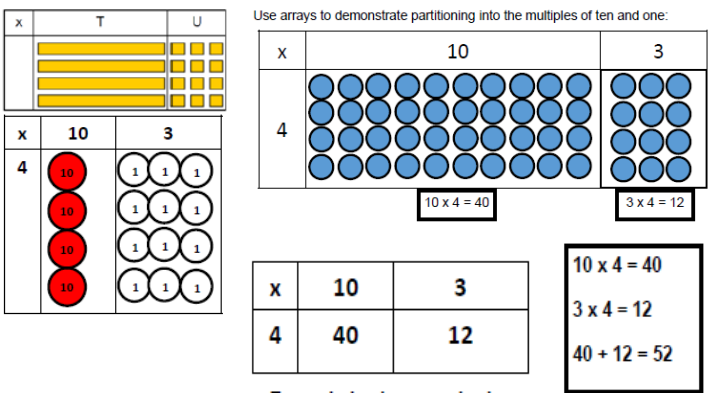
Children will be able to represent a multiplication calculation using an array and write the multiplication symbol within a number sentence. Children will also understand that multiplication can be carried out in any order (commutative).	 3 x 5 = 15 5 x 3 = 15
Children will calculate a multiplication by recalling 2s, 5s and 10s in written form, using fingers to aid counting if needed.	 3 x 10 = 30
Mental Strategies: - Count forwards and backwards in multiples of 2s, 5s and 10s. - Recall doubles of numbers up to and including 10. -Recognise odd and even numbers	

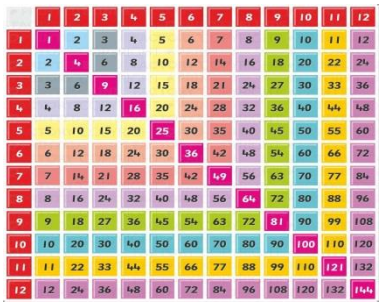
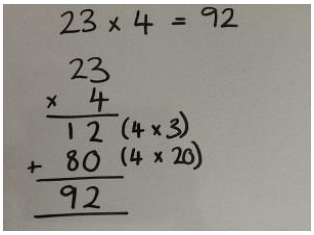
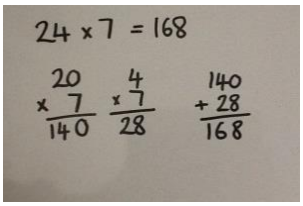
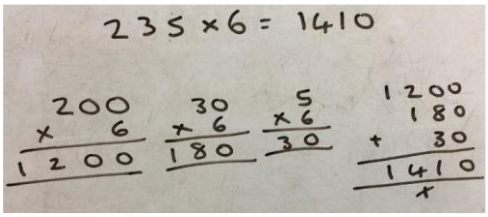
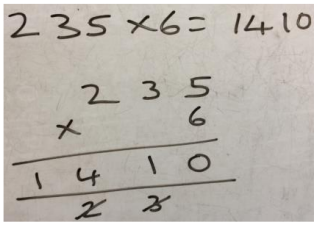
By the end of Key Stage 1 children should be fluent in the times tables of 1, 2, 5 and 10.

Children should be able to recall, solve written calculations for multiplication and division within these times tables.

In the Summer Term of Year 2, children will begin to learn their 3 times table.

Multiplication
Lower Key Stage 2

Year 3:	**Year 4:**
-recall and use multiplication facts for the 3, 4 and 8 multiplication tables -write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods - solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	-recall multiplication facts for multiplication tables up to 12 × 12 -use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; multiplying together three numbers -recognise and use factor pairs and commutativity in mental calculations -multiply two-digit and three-digit numbers by a one-digit number using formal written layout -solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.
Key Vocabulary: multiply, times, groups of, equal groups of, multiple of, multiplied by, estimate, inverse, grid multiplication, expanded column multiplication, partition, commutative, associative, product, short multiplication.	**Key Resources:** arrays, place value counters, number lines, grids, Dienes/ Base 10, bead strings.
Method: **(Continuing to build on previous years)**	**Example/ Representation:** **(Continuing to build on previous years)**
Children will learn to calculate doubles of 2-digit numbers through partitioning.	Double numbers to 50 by partitioning into tens and ones, doubling and recombining e.g. to double 26, first partition into 20 and 6, then:  DOUBLE 20 = 40 DOUBLE 6 = 12 40 + 12 = 52
Repeated addition: Counting in 3s, 4s and 8s and continue to consolidate 2s, 5s and 10s. Moving onto further times tables. This can be done with physical objects in groups, bead strings or using a number line and colouring pattern on 100 square.	
Children will be taught to multiply numbers (TO x O) through partitioning and the formal written method of grid multiplication, using concrete objects where necessary to consolidate.	

Children will learn and use number facts up to 12x12 (end of Year 4).	*A multiplication square can be useful for finding commutative facts, spotting easy patterns and identifying tricky facts that need to be learnt.* 
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 be taught to multiply numbers (TO x O) by partitioning the 2-digit number and using two short multiplications along with addition to solve the problem.	
Children will be taught to multiply numbers (HTO & O) by partitioning the 3-digit number and using two short multiplications along with addition to solve the problem.	
Children will be taught to multiply numbers (HTO x O) using the formal written method of short multiplication.	

By the end of Year 3 children should continue to build on existing knowledge and now know: 3x,6x,4x,8x

By the end of Year 4 children should continue to build on existing knowledge and now know: 7x,9x,11x,12x

Children should be able to recall, solve written calculations for multiplication and division within these times tables.

Multiplication
Upper Key Stage 2

Year 5:
-identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
-know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
-establish whether a number up to 100 is prime and recall prime numbers up to 19
-multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
-multiply numbers mentally drawing upon known facts
-multiply whole numbers and those involving decimals by 10, 100 and 1000

Year 6:
-multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
-perform mental calculations, including with mixed operations and large numbers
-identify common factors, common multiples and prime numbers
-use their knowledge of the order of operations to carry out calculations involving the four operations

Key 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, decimal place, ones/ units, tenths and hundreds

Key Resources:
arrays, place value counters, number lines, grids, Dienes/ Base 10, bead strings.

Method:
(Continuing to build on previous years)

Example/ Representation:
(Continuing to build on previous years)

Children can multiply (TO x TO) in expanded form or grid method through partitioning.

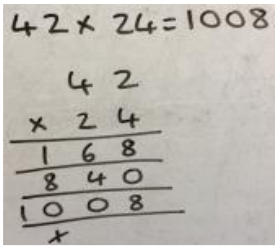
23 x 13 = 299
23
x 13
9 (3 x 3)
60 (20 x 3)
30 (3 x 10)
200 (20 x 10)
299

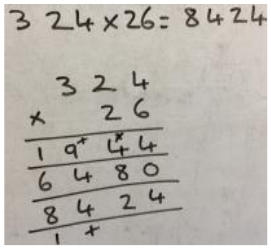
X	20	3
10	200	30
3	60	9

200+60+30+9=299

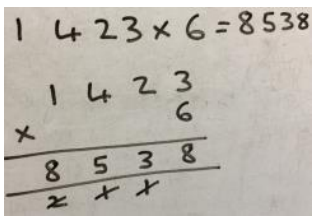
Children will be taught to use the formal written method long multiplication for (TO x TO) and (HTO x TO).

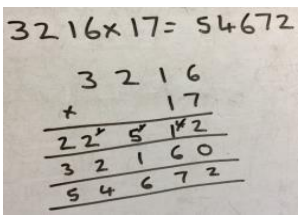
24
x 16
144
+ 240
384

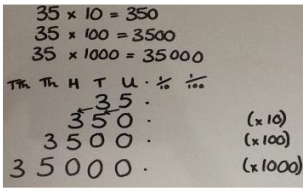




Children will be taught to multiply numbers (ThHTO x O) using the formal written method of short multiplication.
Moving onto children being taught to multiply numbers (ThHTO x TO) using the formal written method of long multiplication.

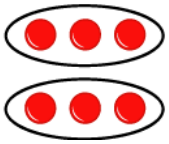
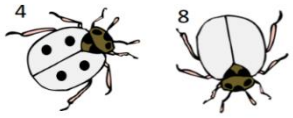




Children will learn to multiply decimal numbers with whole numbers and by 10, 100 and 100 and decimal numbers.	 1 53.2 x 24.0 212.8 1064.0 1276.8
Our aim is that, by the end of Y6, children use mental methods (with jottings) when appropriate, but for calculations that they cannot do mentally, they use an efficient, formal written method accurately and with confidence.	

By the end of Years 5 and 6 children should be fluent in their recall and written knowledge of all times tables facts.

Division

<table>
<tr><td colspan="2"><u>EYFS – Reception:</u>
-Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</td></tr>
<tr><td><u>Key Vocabulary:</u>
halve, half, share, share equally, groups</td><td><u>Key Resources:</u>
Physical counting objects and pictorial representations.</td></tr>
<tr><td><u>Method:</u></td><td><u>Example/ Representation:</u></td></tr>
<tr><td>Children experience early division by sharing objects and counting how many in each group.</td><td>6 shared between 2.
  </td></tr>
<tr><td>Children will solve problems including halving and sharing.</td><td>Share the dots onto the ladybird to find half.
  </td></tr>
<tr><td colspan="2"><u>Mental Strategies:</u>
- Develop a mental image of the number system.
- Understand the value of a number</td></tr>
</table>

Division

Key Stage 1 – Year 1 and Year 2:

Year 1: solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

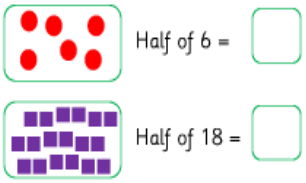
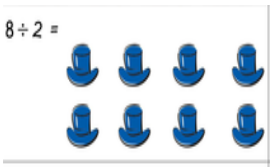
Year 2:

-recall and use division facts for the 2, 5 and 10 multiplication tables.

-calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs

-show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.

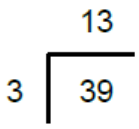
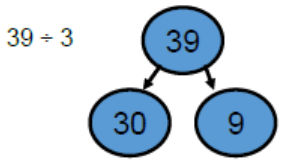
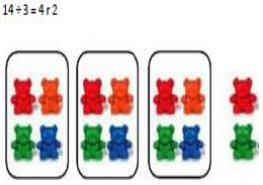
-solve problems involving division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

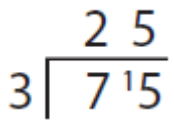
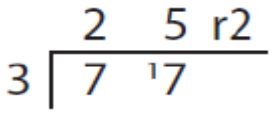
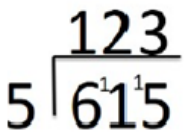
Key Vocabulary: halve, share, share equally, groups, equal groups of, divide, divided by, left, left over.	**Key Resources:** Physical counting objects, picture representations.
Method: **(building on from previous years)**	**Example/ Representation:** **(building on from previous years)**
Children will understand equal groups and share items out in play scenarios. Children will be given a word problem to complete either practically or using pictorial representations.	Share 12 cakes between 3 people equally: 
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 also learn to make marks to halve equally.	 Half of 6 = ☐ Half of 18 = ☐ 
Children will recognise and write the division symbol (÷) in mathematical statements, calculating the answer with the teacher using concrete objects (yr1).	8 ÷ 2 = 4 
Children will be able to represent a division calculation using an array and write the division within a number sentence. Children will also understand that multiplication can be carried out in any order (commutative) and division cannot.	 6 ÷ 2 = 3  8 ÷ 2 =
Children will calculate division by recalling 2s, 5s and 10s in written form, using fingers to aid counting if needed.	 30 ÷ 10 = 3

Mental Strategies:

- Count forwards and backwards in multiples of 2s, 5s and 10s.
- 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

Division
Lower Key Stage 2

Year 3:	**Year 4:**
-recall and use division facts for the 3, 4 and 8 multiplication tables -write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods -solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	-recall division facts for multiplication tables up to 12 × 12 -use place value, known and derived facts to divide mentally, dividing by 1 -recognise and use factor pairs and commutativity in mental calculations -multiply two-digit and three-digit numbers by a one-digit number using formal written layout (division) -solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.
Key Vocabulary: divided by, divide, divided into, grouping, short division, remainder, inverse, factor, divisible by, short division.	**Key Resources:** arrays, place value counters, number lines, grids, Dienes/ Base 10, bead strings.
Method: **(Continuing to build on previous years)**	**Example/ Representation:** **(Continuing to build on previous years)**
Children will link division to multiplication (inverse) through arrays of concrete objects or pictorial representations.	Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15 
Children can physically group concrete objects with no remainders.	Using Dienes/ Base 10. Share the tens and then the ones. 48 ÷ 4 = 12 
Children will learn to use the short division method and their knowledge of the multiples with no remainders.	 
Children will learn to calculate division when there are remainders in practical and written methods.	 13 ÷ 4 = 3 remainder 1 Children to count up their times tables facts in their heads 
Children will learn to divide outside of their known multiple facts through grouping.	Use times table knowledge to support calculations: 10 x 3 = 30 5 x 3 = 15 10 + 5 = 15 [there are 15 groups of 3 in 45]

Children can progress on to short division (bus method) when there are remainders. NB. Remainders are not mentioned in the NC until Yr5.	  Yr4 

Division
Upper Key Stage 2

Year 5:	**Year 6:**
-divide numbers mentally drawing upon known facts -divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context - divide whole numbers and those involving decimals by 10, 100 and 1000	-divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context -divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context -perform mental calculations, including with mixed operations and large numbers -use their knowledge of the order of operations to carry out calculations involving the four operations
Key Vocabulary: divided by, divide, divided into, grouping, short division, remainder, inverse, factor, divisible by, short division.	**Key Resources:** arrays, place value counters, number lines, grids, Dienes/ Base 10, bead strings.
Method: **(Continuing to build on previous years)**	**Example/ Representation:** **(Continuing to build on previous years)**
Continue to practice formal written method with or without remainders.	8) 1 8 ²4 → 2 3 5) 4 3 ³2 → 8 6 r 2 The remainder can also be expressed as a fraction: $\frac{2}{5}$ which is the remainder divided by the divisor.
Children will learn to use long multiplication when dividing with numbers greater than 12. Children will express remainders as fractions or decimals.	432 ÷ 15 becomes $\frac{12}{15} = \frac{4}{5}$ 2 8 r 12 1 5) 4 3 2 3 0 0 1 3 2 1 2 0 1 2 The r12 is converted to a decimal, using the knowledge that 1/5 = 0.2 therefore 0.2 x 4 = 0.8 = $\frac{4}{5}$ 2 8 · 8 1 5) 4 3 2 · 0 3 0 ↓ 1 3 2 1 2 0 ↓ 1 2 0 1 2 0 0
Our aim is that, by the end of Y6, children use mental methods (with jottings) when appropriate, but for calculations that they cannot do mentally, they use an efficient, formal written method accurately and with confidence.	