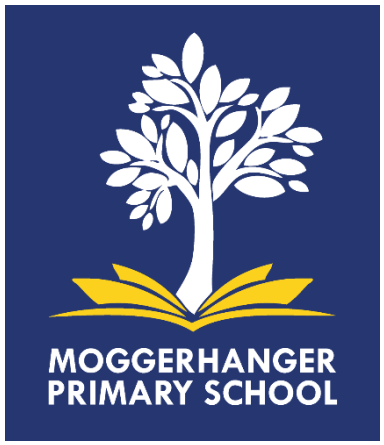


CALCULATION POLICY

2022-2023

Effective Date: May 2021

Last Reviewed: April 2022

Reviewed by: Karen Hayward

Next Review Date: May 2023

Introduction

This Calculation Policy has been written with the aims of mathematics as set out in the National Curriculum at the heart of it;

The national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

A developing knowledge of the four operations forms a solid understanding of place value, the connections between the four operations and a general sense of number (such as, for example, odd or even, multiples or if two numbers are similar in size). The aim of this policy is to ensure that:

- Children are aware of and can use the correct mathematical technology in order to communicate (verbally and in writing) their reasoning and calculation strategies
- Children can draw from a range of calculation methods and choose the most appropriate, efficient and accurate method to complete a calculation with fluency.
- Children follow the Concrete, Pictorial, Abstract (CPA) approach to developing methods of calculations, using concrete resources to develop understanding before moving to pictorial and abstract methods. Concrete resources such as numicon, cubes, counters, etc. can be used to reinforce understanding and provide support when calculating mentally or using written methods. Diagrams and pictorial models such as bar models and part-whole diagrams can also be used
- Children progress between the CPA stages once they have mastered each stage. They should not be hurried and should be able to make their preferred choice in order to choose the most appropriate, efficient and accurate method for them. Previous stages can be revisited to reinforce learning before introducing new stages. Allowing children to make connections between the different methods that have consolidated and identify similarities and differences.

This policy includes sections on: Addition, Subtraction, Multiplication and Division. It outlines progression in teaching, organised by mathematical operation in order to ensure a smooth transition from one year group to the next. Mathematical representations are first of all concrete (e.g. base ten, apparatus, numicon), then pictorial (e.g. arrays and place value counters) to facilitate abstract working (e.g. columnar addition and long multiplication.)

Methods are referenced when they are introduced to the children, although teachers and parents are encouraged to revisit previous year groups to consolidate learning.

This policy is largely adapted from the White Rose Maths Hub Calculation policy with extra material added. It is a working document and will be updated.

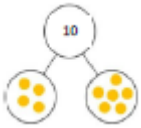
Addition

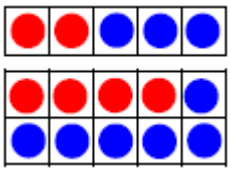
Key Vocabulary	Models and Images
Add	Bead strings
Sum	Number lines (both marked and unmarked)
Addition	Place value counters
Altogether	Place value grids
Plus	Place value cards
Increase	Numicon
And	Counting sticks
More	Hundred squares
Count on	Bar model
Count all	IT resources
Total	
Bonds	
Pairs	

EYFS Addition Objectives

- Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer [within 10]
- Say one more and one less than a number

Composing numbers using concrete apparatus such as five/ten frames [working within 10]

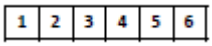




Addition as increasing by combining two or more groups using concrete apparatus. Children construct calculations verbally or using cards [encourage notations when appropriate]

3 + 1 = 4

Number tracks can  be used to support finding one more than a given number.

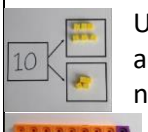
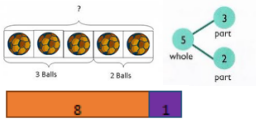


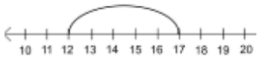
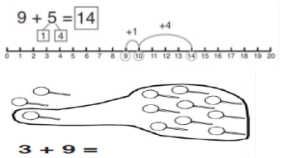
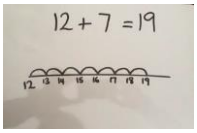
Count on from the larger number. A child will choose the larger number, even when it is not the first and count on from there; (5 in your head) 'six, seven, eight' using their fingers:

3 + 5 = 8

Year 1 Addition Objectives

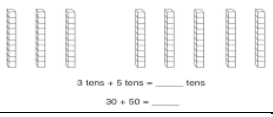
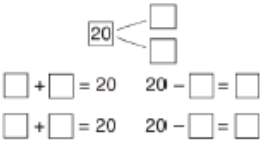
- Year 1 Objectives
- Given a number, identify one more
- Read, write and interpret mathematical statements involving addition (+) and the equals (=) sign
- Add one-digit and two-digit numbers within 20, including zero
- Solve missing number problems (e.g. 6 + ☐ = 10).

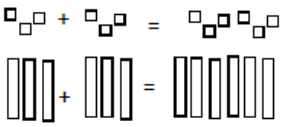
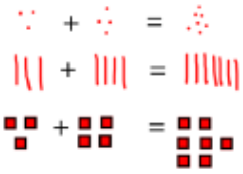
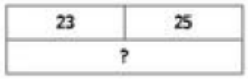
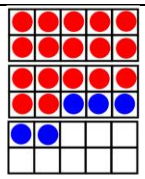
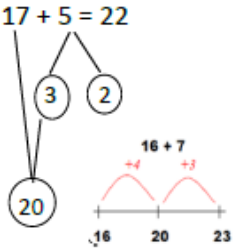
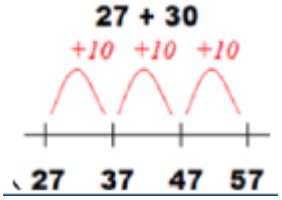
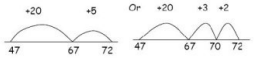
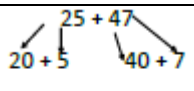
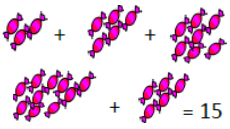
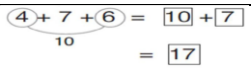
Objective and strategy	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model.	 Use part-part whole model.  Use cubes to add two numbers together as a group or in a bar.	Use pictures to add two numbers together as a group or in a bar. 	Use the part-part whole diagram as shown above to move into the abstract. 6 + 4 = 10

Starting at the bigger number and counting on.	Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer. 	Start at the larger number on the number line and count on in ones or in one jump to find the answer. 	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.
Regrouping to make 10. *This is an essential skill for column addition later.*	 Start with the bigger number and use the smaller number to make 10. Use ten frames. 	Use pictures or a number line. Regroup or partition the smaller number using the part-part whole model to make 10. 	If I am at seven, how many more do I need to make 10. How many more do I add on now? 7 + 4= 11
Represent and use number bonds and related subtraction facts within 20.	 2 more than 5		Emphasis should be on the language '1 more than 5 is equal to 6.' *'2 more than 5 is 7.'*

Year 2 Addition Objectives

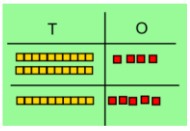
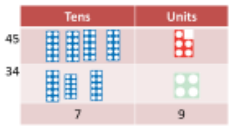
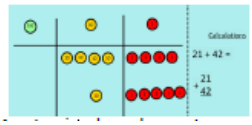
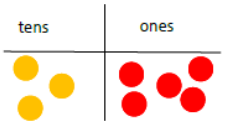
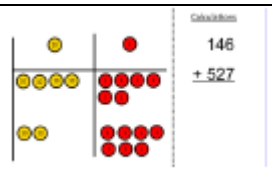
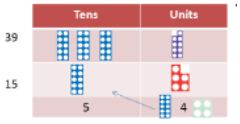
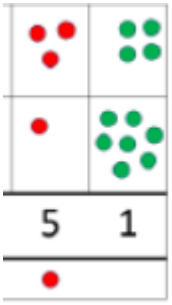
- Add numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones;
  - a two-digit number and tens;
  - two two-digit numbers;
  - three one-digit numbers.

Objective and strategy	Concrete	Pictorial	Abstract
Adding multiples of 10.	50 = 30 – 20  Model using concrete resources	Use representations for the base ten 	20 + 30 = 50 70 = 50 + 20 40 + □ = 60
Use known number facts (part-part whole).	Explore making different numbers within 20 		

Using known facts.		Children draw representations of hundreds, tens and ones 	3 + 4 = 7 Means that we know 30 + 40 = 70 Means that we know 300 + 400 = 700
Bar model.	 Use concrete resources to show addition	 Children begin drawing the bar model	 23 + 25 = 48
Adding a 2-digit number and a one-digit number.	 Use a ten frame to show tens. Explore the pattern of adding 5	Use a part whole model and a number line to model addition. 	Explore related facts of the commutative law of addition 17 + 5 = 22 5 + 17 = 22 22—17 = 5 22—5 = 17
Adding a 2-digit number and tens.	Explore the fact that the ones digit does not change. 		27 + 10 = 37 27 + 20 = 47 27 + □ = 57
Adding two 2-digit numbers.	Model using numicon, dienes, place value counters, etc. 	 Use a number line. Bridge 10 using part whole if necessary.	 20 + 40 = 60 5+ 7 =12 60 + 12 = 72
Adding three 1-digit numbers.	 Combine to make 10 if possible, or bridge 10 and then add the third digit.	Regrouping and drawing representations 	 Use known facts (such as number bonds) and then adding on the third number.

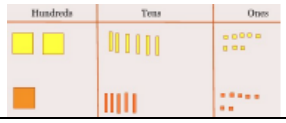
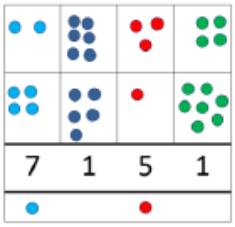
Year 3 Addition Objectives

- Add and subtract 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 method of columnar addition, where appropriate.

Objective and strategy	Concrete	Pictorial	Abstract
Column addition *no regrouping/friendly numbers* Adding two or three 2 or 3- digit numbers.	Model using dienes or numicon  Add together the ones first, then the tens  Progress to using place value counters. 	Children move to drawing counters using a tens and ones frame 	Add the ones first, then then tens, then the hundreds. 2 2 3 + 1 1 4 3 3 7
Column addition *with regrouping.*	 Exchange ten ones for one ten. Model using numicon or place value counters. 	Draw representations of the place value grids. Carrying the ten underneath the line. 	20 + 5 40 + 8 60 + 13 = 73 Start by partitioning the numbers before formal column addition to show the exchange. 536 + 85 621 1 1

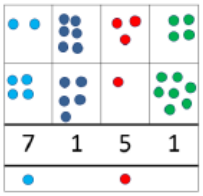
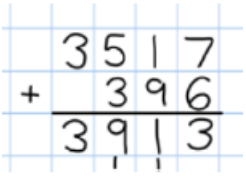
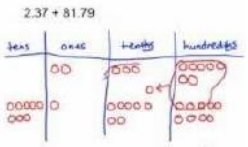
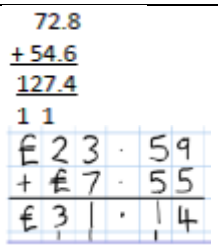
Year 4 Addition Objectives

- Add and subtract numbers mentally, including:
    - a four-digit number and ones;
    - a four-digit number and tens;
    - a four-digit number and hundreds;
    - a four-digit number and thousands.
- Add and subtract numbers with up to 4 digits, using formal written method of columnar addition, where appropriate.

Objective and strategy	Concrete	Pictorial	Abstract
Add numbers with up to 4-digits.	Children continue to use dienes or PV counters to add, exchanging ten ones for a ten and ten tens for a hundred, and ten hundreds for a thousand. 	 Draw representations using place value grids	Continue from previous work to carry hundreds as well as tens. Relate to money and measures.

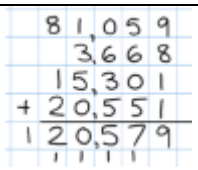
Year 5 Addition Objectives

- Add and subtract numbers mentally, with increasingly large numbers.
- Add whole numbers with more than 4 digits, including using formal written method (column addition).

Objective and strategy	Concrete	Pictorial	Abstract
Add numbers with more than 4 digits.	As Year 4, extending representations to include further place value columns.	Use place value grids to draw representations. 	Continue from previous work to carry hundreds as well as tens. Relate to money and measures. 
Add decimals with 2 decimal places, including money.	 Introduce decimal place value counters and model exchanges for addition.		

Year 6 Addition Objectives

- 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;
  - three one-digit numbers.

Objective and strategy	Concrete	Pictorial	Abstract
Add several numbers of increasing complexity. Including adding money, measure and decimals with different numbers of decimal points.	As Year 5	As Year 5	 Insert 0 for place holders. 

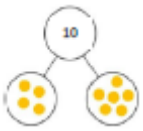
Subtraction

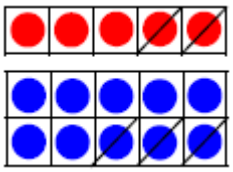
Key Vocabulary	Models and Images
Subtract Less than Take away Fewer than Take from Decrease by Distance between Deduct Difference Reduce Count back/on Minus Inverse Exchange Children need to understand that subtraction is not commutative or associative.	Number tracks Bead strings Number lines [marked and unmarked] Base 10 Place value counters Place value (arrow) cards Ten frames Numicon Cuisenaire Counting sticks Hundred squares Bar model IT resources

EYFS Subtraction Objectives

- Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer [within 10]
- Say one more and one less than a number

Decomposing numbers using concrete apparatus such as five/ten frames [within 10]

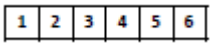




Subtraction as decreasing, taking away and finding the difference using concrete apparatus. Children construct calculations verbally or using cards [encourage notations when appropriate]

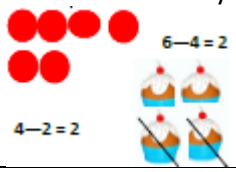
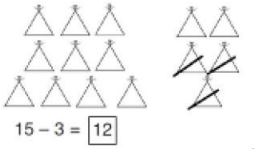
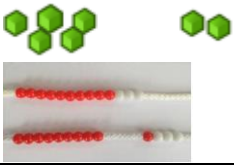
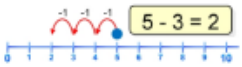
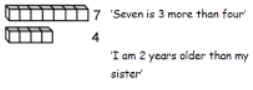
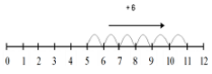
5 - 2 = 3

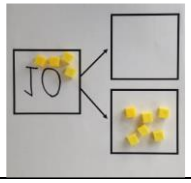
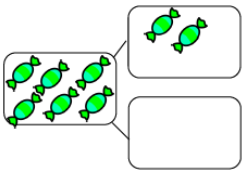
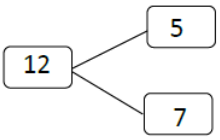
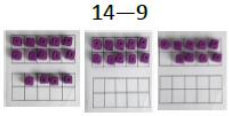
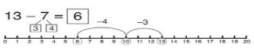
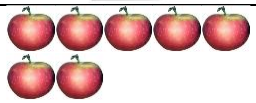
Number tracks can be used to support finding one more than a given number.



Year 1 Subtraction Objectives

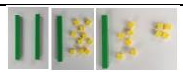
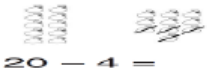
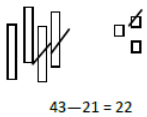
- Given a number, identify one less
- Read, write and interpret mathematical statements involving subtraction (-) and the equals (=) sign
- Subtract one-digit and two-digit numbers within 20, including zero
- Solve missing number problems e.g. 7 = ☐ - 9

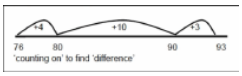
Objective and strategy	Concrete	Pictorial	Abstract
Taking away ones.	Use physical objects, counters, cubes, etc. to show how objects can be taken away.  	Cross out drawn objects to show what has been taken away.  	7—4 = 3 16—9 = 7
Counting back.	Move objects or beads away from the group, counting backwards. 	 Count back in ones using a number line.	Put 13 in your head and count back 4. What number are you at now?
Find the difference.	Compare objects and amounts.  	Use a number line to find difference.  	Hannah has 12 sweets and her sister has 5. How many more does Hannah have than her sister?

Represent and use number bonds related subtraction facts within 20.	Linking to addition, use part-part whole models to demonstrate the inverse. 		Use numbers rather than pictorial representation in the part-part whole model. 
Make 10.	Make 14 on the ten frame. Take 4 away to make ten, then take one more away so that you have taken 5. 	13-7=6  Jump back 3 first, then another 4. Use ten as the stopping point.	How many do we take off first to get to 10? How many left to take off?
Bar model.	 5-2=3	 10-2=8	 10 = 8 + 2 10 = 2 + 8 10—2 = 8 10—8 = 2

Year 2 Subtraction Objectives

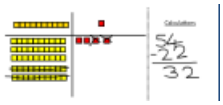
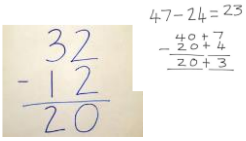
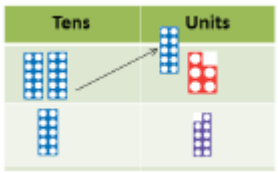
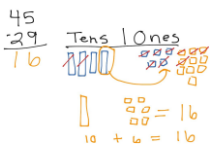
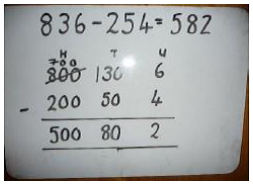
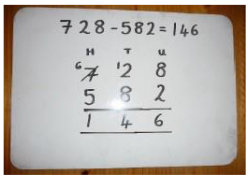
- Subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two digit number subtract ones;
  - a two digit number subtract tens;
  - two-digit numbers subtract two-digit.

Objective and strategy	Concrete	Pictorial	Abstract
Regroup a ten into ten ones.	 Use a PV chart to show how to change a ten into ten ones, use the term 'take and make'		20—4 = 16
Partitioning to sub-tract without re-grouping. (Friendly numbers)	 34—13 = 21	Children draw representations of Dienes and cross off. 	43—21 = 22

	Use Dienes to show how to partition the number when subtracting without regrouping.		
Make ten strategy *Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.*	34—28 Use a bead bar or bead strings to model counting to next ten and the rest.	Use a number line to count on to next ten and then the rest. 	93—76 = 17

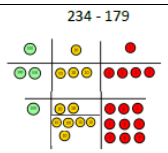
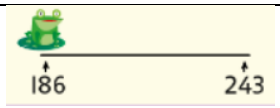
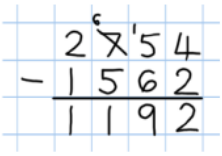
Year 3 Subtraction Objectives

- Subtract numbers mentally, including:
  - a three-digit number subtract ones;
  - a three-digit number subtract tens;
  - a three-digit number subtract hundreds.
- Subtract numbers with up to three digits, using formal written method of columnar subtraction, where appropriate.

Objective and strategy	Concrete	Pictorial	Abstract
Column subtraction without regrouping (friendly numbers).	Use base 10 or Numicon to model. 	Draw representations to support understanding. 	Intermediate step may be needed to lead to clear subtraction understanding. 
Column subtraction with regrouping.	Begin with base 10 or Numicon. Move to PV counters, modelling the exchange of a ten into ten ones. Use the phrase 'take and make' for exchange. 	Children may draw base ten or PV counters and cross off. 	Begin by partitioning into PV columns.  Then move to formal method. 

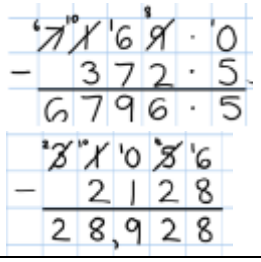
Year 4 Subtraction Objectives

- Subtract numbers mentally, including:
    - a four-digit number subtract ones;
    - a four-digit number subtract tens;
    - a four-digit number subtract hundreds;
    - a four-digit number subtract thousands.
- Subtract numbers with up to 4 digits, using formal written method of columnar addition, where appropriate.

Objective and strategy	Concrete	Pictorial	Abstract
Subtract with up to 4 digits. *Introduce decimal subtraction through context of money.*	 Model process of exchange using Numicon, base ten and then move to PV counters.	 Children use number lines to count on from the smaller number to the larger number.	Use the phrase take and make for exchange. 

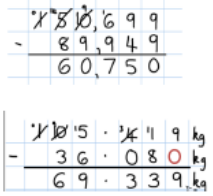
Year 5 Subtraction Objectives

- Subtract numbers mentally, with increasingly large numbers
- Subtract whole numbers with more than 4 digits, including using formal written method (column subtraction).

Objective and strategy	Concrete	Pictorial	Abstract
Subtract with at least 4 digits, including money and measures. *Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal.*	As Year 4.	Children to draw PV counters and show their exchange—see Year 3.	Use 0 for place value holders. 

Year 6 Subtraction Objectives

- Perform mental calculations, including with mixed operations and large numbers.

Objective and strategy	Concrete	Pictorial	Abstract
Subtract with increasingly large and more complex numbers and decimal values.			

Multiplication

Key Vocabulary	Models and Images
Multiply	Number tracks
Multiplication	Bead strings
Times	Number lines [marked and unmarked]
Lots of	Base 10
Groups of	Place value counters
Sets of	Place value (arrow) cards
Product	Ten frames
Multiple	Numicon
Double	Cuisenaire
Factors	Counting sticks
Repeated addition	Hundred squares
Commutative	Bar model
Distributive	IT resources
Associative	

EYFS Multiplication Objectives

- Solve problems, including doubling, halving and sharing.

Multiplication can be introduced through repeated addition and doubling related to real life contexts.

Can you double the number of spots on the ladybird?

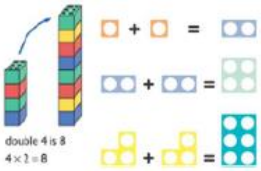
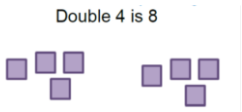
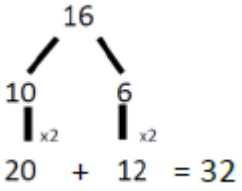
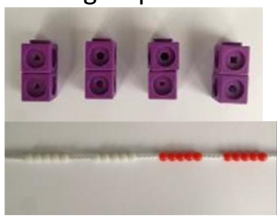
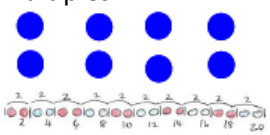
This can be extended to writing the calculation by using addition [5 + 5 = 10].

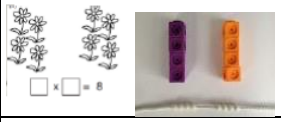
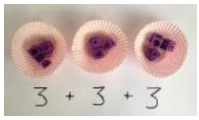
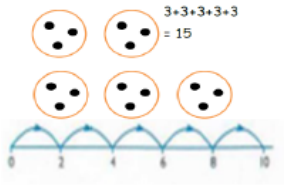
Exceeding expectation - children solve practical problems that involve combining groups of 2, 5, or 10.

How many wheels are there altogether?

Year 1 Multiplication Objectives

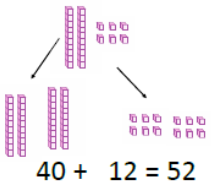
- Count in multiples of twos, fives and tens (to the 10th multiple).
- Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

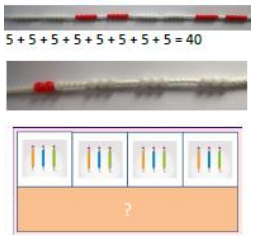
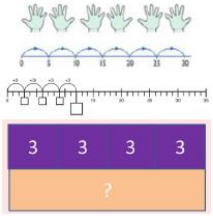
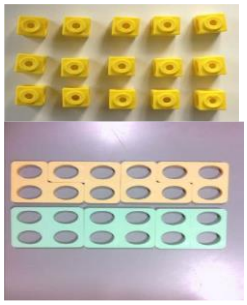
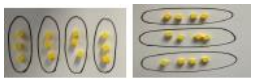
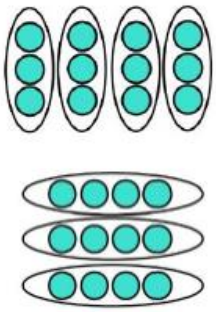
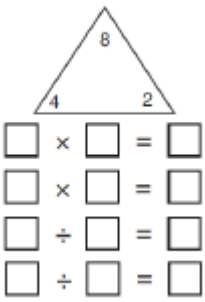
Objective and strategy	Concrete	Pictorial	Abstract
Doubling.	Use practical activities using manipulatives including cubes and Numicon to demonstrate doubling. 	Draw pictures to show doubling numbers. 	Partition a number and then double each part before recombining it back together. 
Counting in multiples.	Count groups 	Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30

Making equal groups and counting the total.	Use manipulatives to create equal groups. 	Draw and make representations.	2 x 4 = 8
Repeated addition.	Use different objects to add equal groups.  	 Use pictorial representations, including number lines to solve problems	 Write addition sentences to describe objects and pictures.
Understanding arrays.	Use objects laid out in arrays to find the answers to 2 lots 5, 3 lots of 2, etc. 	Draw representations of arrays to show understanding.	3 x 2 = 6 2 x 5 = 10

Year 2 Multiplication Objectives

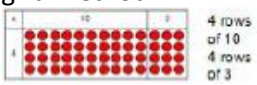
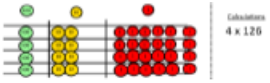
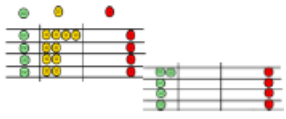
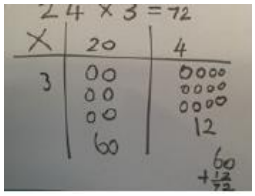
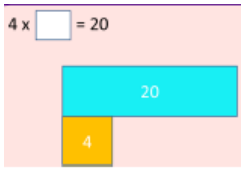
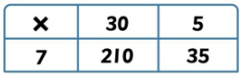
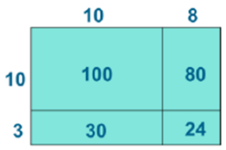
- Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context.

Objective and strategy	Concrete	Pictorial	Abstract
Doubling.	Model doubling using dienes and PV counters. 	Draw pictures and representations to show how to double numbers.	Partition a number and then double each part before recombining it back together.

Counting in multiples of 2, 3, 4, 5, and 10 from 0 (repeated addition).	Count the groups as children are skip counting. Children may use their fingers as they are skip counting. Use bar models. 	Number lines, counting sticks and bar models should be used to show representation of counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25, 30 $4 \times 3 = \square$
Commutativity.	Create arrays using counters and cubes and numicon.  Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer. 	Use representations of arrays to show different calculations and explore commutativity. 	12 = 3 × 4 12 = 4 × 3 Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15
Using the inverse. *This should be taught alongside division, so pupils learn how they work alongside each other.*	 Use arrays of concrete objects to show the inverse operations.		2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8÷ 2 Show all 8 related fact family sentences.

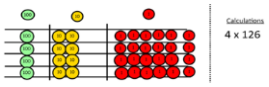
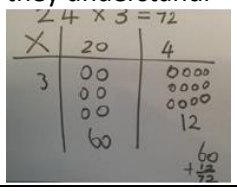
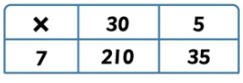
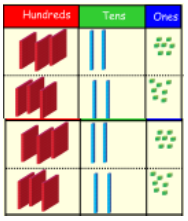
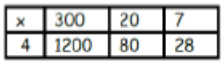
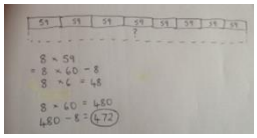
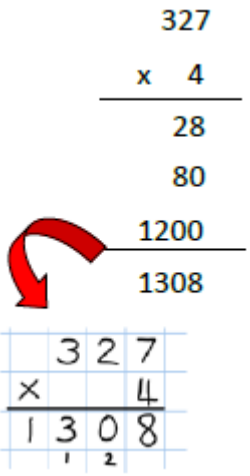
Year 3 Multiplication Objectives

- Recall and use multiplication facts for the 3, 4 and 8 multiplication tables (continue to practise the 2, 5 and 10 multiplication tables)
- Count in steps of 4, 8, 50 and 100
- 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 strategies and progressing to a formal written method
- 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.

Objective and strategy	Concrete	Pictorial	Abstract
Grid method.	Show links with arrays to first introduce the grid method.  Move onto base ten to move towards a more compact method.  Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows  Fill each row with 126  Add up each column, starting with the ones making any exchanges needed.  Then you have your answer.	Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns, to show their thinking as shown below.  Bar model are used to explore missing numbers.  	Start with multiplying by one-digit numbers and showing the clear addition alongside the grid.  210 + 35 = 245 Moving forward, multiply by a 2-digit number showing the different rows within the grid method. 

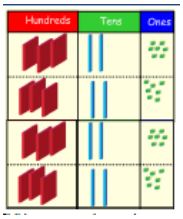
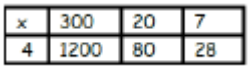
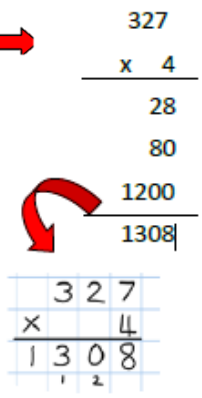
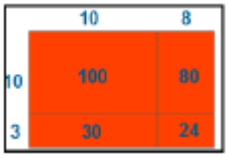
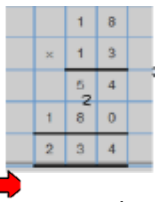
Year 4 Multiplication Objectives

- Recall multiplication and division facts for multiplication tables up to 12 × 12
- Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 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 a 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.

Objective and strategy	Concrete	Pictorial	Abstract
Grid method recap from year 3 for 2 digits x 1 digit. Move to multiplying 3-digit numbers by 1 digit.	Use place value counters to show how we are finding groups of a number. 	Children can represent their work with place value counters in a way that they understand. 	Start with multiplying by one-digit numbers and showing the clear addition alongside the grid.  210 + 35 = 245
Column multiplication.	Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642.  It is important at this stage that they always multiply the ones first.	The grid method may be used to show how this relates to a formal written method.  Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. 	

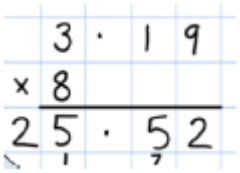
Year 5 Multiplication Objectives

- 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 (non-prime) numbers
- Establish whether a number up to 100 is prime and recall prime numbers up to 19
- Multiply numbers mentally, drawing upon known facts
- Multiply whole numbers and those involving decimals by 10, 100 and 1000
- Recognise and use square numbers and cube numbers, as well as the notation for squared (²) and cubed (³)
- 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
- Solve problems involving multiplication, including using their knowledge of factors and multiples, squares and cubes
- Solve problems involving multiplication, including scaling by simple fractions and problems involving simple rates.

Objective and strategy	Concrete	Pictorial	Abstract
Column multiplication for 3 and 4-digit x 1- digit number.	Important to always multiply the ones first.  Children can continue to be supported by place value counters at the stage of multiplication. This is initially done where there is no regrouping. 321 x 2 = 642	 	
Column multiplication.	Manipulatives may still be used with the corresponding long multiplication modelled alongside.	Continue to use bar modelling to support problem solving.  	 18 x 3 on the first row (8 x 3 =24, carrying the 2 for 20, then 1 x 3). 18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first.

Year 6 Multiplication Objectives

- Perform mental calculations, including with mixed operations and large numbers
- Multiply one-digit numbers, with up to two decimal places, by whole numbers
- Identify common factors, common multiples and prime numbers
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Objective and strategy	Concrete	Pictorial	Abstract
Multiplying decimals up to 2 decimal places by a single digit.			Remind children that the single digit belongs in the unit's column. Line up the decimal points in the question and the answer. 

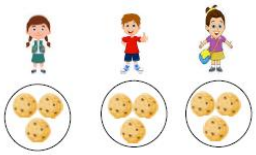
Division

Key Vocabulary	Models and Images
Share Divide Lots of Groups of Sets of Halving Equally Halving Remainders Inverse Quotient Divisor Dividend Repeated subtraction Goes into	Practical objects (e.g. socks, straws, cubes, hoops, pots) Bar model Place value counters Diennes Counting stick IT Resources (e.g. MyMaths, Maths Works, ITPs)

EYFS Division Objectives

- Solve problems, including doubling, halving and sharing.

Dividing by sharing into equal groups related to real life contexts.



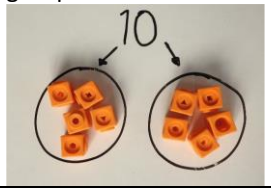
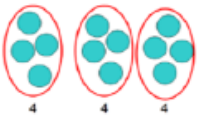
There are 3 children and 12 biscuits. How many will each child have?

Dividing by practically halving an amount.

Year 1 Division Objectives

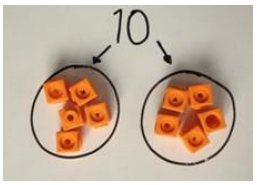
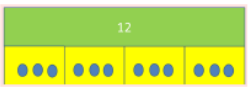
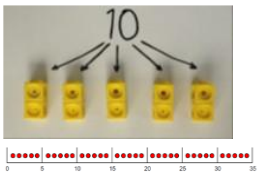
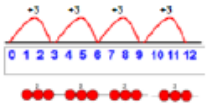
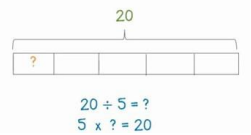
- Solve one-step problems involving division by calculating the answer, using concrete objects, pictorial representations and arrays with the support of the teacher.
- Count in multiples of twos, fives and tens (to the 10th multiple).

Sharing into equal groups to divide by 2, 5 and 10. *(children start off with concrete apparatus and pictorial representations and move on to abstract concrete apparatus)*

Objective and strategy	Concrete	Pictorial	Abstract
Division as sharing.	  I have 10 cubes, can you share them equally in 2 groups? 	Children use pictures or shapes to share quantities.  8 shared between 2 is 4.  12 shared between 3 is 4.	12 shared between 3 is 4.

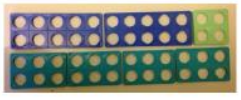
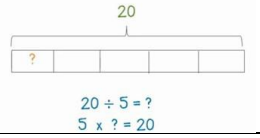
Year 2 Division Objectives

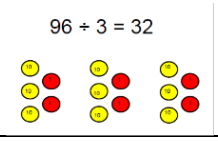
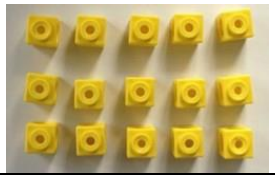
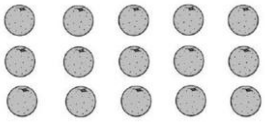
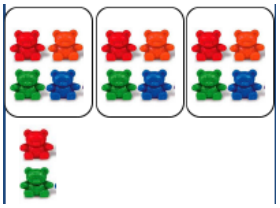
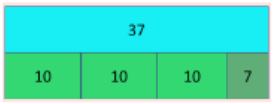
- Recall and use division facts for the 2, 5 and 10 multiplication tables
- Solve problems involving division, using materials, arrays, repeated subtraction, mental methods, and multiplication and division facts, including problems in contexts
- Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs
- Show that division of one number by another is not commutative [i.e. can be done in any order].

Objective and strategy	Concrete	Pictorial	Abstract
Division as sharing.	I have 10 cubes; can you share them equally in 2 groups? 	Children use bar modelling to show and support understanding. 	12 ÷ 3 = 4
Division as grouping.	Divide quantities into equal groups. Use cubes, counters, objects or place value counters, to aid understanding. 	Use number lines for grouping.  Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. 	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

Year 3 Division Objectives

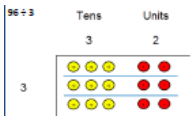
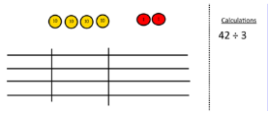
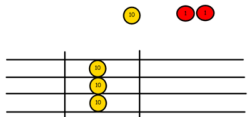
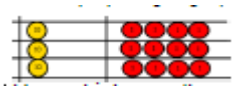
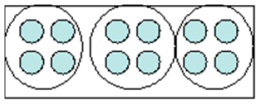
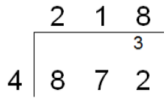
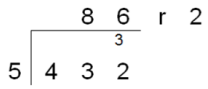
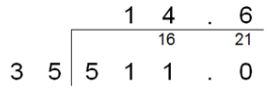
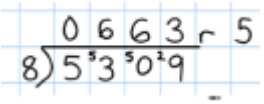
- Recall and use division facts for the 3, 4 and 8 multiplication tables
- Write and calculate mathematical statements for division, using the multiplication tables that they know, including for 2-digit numbers divided by single-digit numbers, using mental strategies and progressing to formal written 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.

Objective and strategy	Concrete	Pictorial	Abstract
Division as grouping.	Use cubes, counters, objects or place value counters to aid understanding. 	Continue to use bar modelling to aid solving division problems. 	How many groups of 6 in 24? 24 ÷ 6 = 4

	24 divided into groups of 6 = 4 		
Division with arrays.	Link division to multiplication by creating an array and thinking about the number sentences that can be created, e.g. 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15 	Draw an array and use lines to split the array into groups to make multiplication and division sentences. 	Find the inverse of multiplication and division sentences by creating eight linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7 28 = 7 x 4 28 = 4 x 7 4 = 28 ÷ 7 7 = 28 ÷ 4
Division with remainders.	14 ÷ 3 = Divide objects between groups and see how much is left over 	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.  Draw dots and group them to divide an amount and clearly show a remainder.  Use bar models to show division with remainders. 	Complete written divisions and show the remainder using 'r'. 

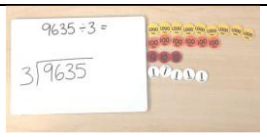
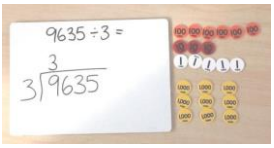
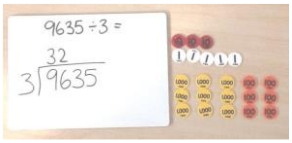
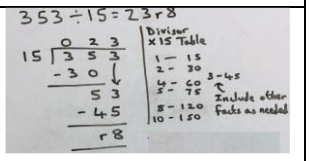
Year 4 Division Objectives

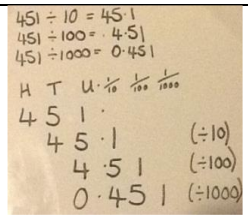
- Recall division facts for multiplication tables up to 12 × 12
- Use place value, known and derived facts to divide mentally, including dividing by 1
- Recognise and use factor pairs in mental calculations
- Divide two-digit and three-digit numbers by a one-digit number, using formal written layout
- Solve problems involving division, integer scaling problems and harder correspondence problems, such as, 'n' objects are connected to 'm' objects.

Objective and strategy	Concrete	Pictorial	Abstract
Divide at least 3-digit numbers by 1 digit. Short Division.	Use place value counters to divide using the bus stop method alongside.  Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.  We exchange this ten for ten ones and then share the ones equally among the groups.  We look how much in 1 group so the answer is 14. 	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups. Encourage them to move towards counting in multiples to divide more efficiently. 	Begin with divisions that divide equally with no remainder.  Move onto divisions with a remainder.  Finally move into decimal places to divide the total accurately.  

Year 5 Division Objectives

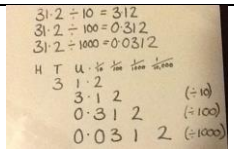
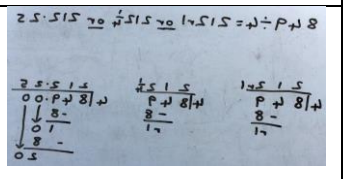
- Divide numbers up to 4 digits by a one-digit number, using the formal written method of short division and interpret remainders appropriately for the context
- Solve problems involving division, including using their knowledge of factors and multiples, squares and cubes
- Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- Solve problems involving multiplication

Objective and strategy	Concrete	Pictorial	Abstract
Children will use written methods to solve division number sentences with remainders.	 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 thousand's column.  Group the 100s counters according to the divisor and write the number of groups above the line in the hundred's column.  Group the 10s counters according to the divisor and write the number of groups above the line in the ten's column.  Group the units counters according to the divisor and write the number of groups about the line in the units column. Express remainders as 'r2' as part of the quotient.	Children can continue using pictorial representations to model the problems.	

Children will learn to divide whole numbers and those involving decimals by 10, 100 and 1000 by moving the digits around the fixed decimal.			 ,

Year 6 Division Objectives

- Perform mental calculations, including with mixed operations and large numbers
- 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 and where appropriate, interpreting remainders according to the context
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- Use written division methods in cases where the answer has up to two decimal places.

Objective and strategy	Concrete	Pictorial	Abstract
Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division.			View appendix.
Divide numbers decimal numbers with up to 3 decimal places by 10, 100 and 1000 by moving the digits around a fixed decimal.	Children manipulate real objects.	Children draw place value grids to show the numbers moving place value.	
Interpret remainders as whole number remainders, fractions or decimals.			

Appendix

Long division

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
h t o 1 2) 2 7 8 Two goes into 2 one time, or 2 hundreds ÷ 2 = 1 hundred.	h t o 1 2) 2 7 8 - 2 0 Multiply 1 × 2 = 2, write that 2 under the two, and subtract to find the remainder of zero.	h t o 1 8 2) 2 7 8 - 2 ↓ 0 7 Next, drop down the 7 of the tens next to the zero.
Divide.	**Multiply & subtract.**	**Drop down the next digit.**
h t o 1 3 2) 2 7 8 - 2 0 7 Divide 2 into 7. Place 3 into the quotient.	h t o 1 3 2) 2 7 8 - 2 0 7 - 6 1 Multiply 3 × 2 = 6, write that 6 under the 7, and subtract to find the remainder of 1 ten.	h t o 1 3 2) 2 7 8 - 2 0 7 - 6 1 8 Next, drop down the 8 of the ones next to the 1 leftover ten.
1. Divide.	**2. Multiply & subtract.**	**3. Drop down the next digit.**
h t o 1 3 9 2) 2 7 8 - 2 0 7 - 6 1 8 Divide 2 into 18. Place 9 into the quotient.	h t o 1 3 9 2) 2 7 8 - 2 0 7 - 6 1 8 - 1 8 0 Multiply 9 × 2 = 18, write that 18 under the 18, and subtract to find the remainder of zero.	h t o 1 3 9 2) 2 7 8 - 2 0 7 - 6 1 8 - 1 8 0 There are no more digits to drop down. The quotient is 139.