Granby Junior School

Maths Calculation Policy

Review Date	Approved by	Governor Minute Reference
July 2027		

Date: July 2026

DERBYSHIRE County Council
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Granby Junior School Calculation Policy 2026 -2027

At Granby Junior School we believe that learning in mathematics should be underpinned through a concrete, pictorial and abstract approach. Both mental and written methods are important and children will be taught how to choose the most efficient method depending on the calculation given.
The calculation policy covers year 1 to year 6 to ensure that progression from Infants to KS2 is clear and to support the catch-up curriculum. In line with NCETM teaching-for-mastery principles, mathematics is taught through carefully sequenced small steps so that pupils develop deep, connected understanding. Teaching should make mathematical structures visible through carefully chosen representations, precise language, intelligent practice and opportunities for pupils to reason, explain and solve problems. Where pupils need further support, this should be identified quickly so that gaps are addressed before misconceptions become embedded.

White Rose Maths Approach

Our calculation policy is aligned with a mastery approach to mathematics, drawing on the principles of White Rose Maths and the NCETM teaching-for-mastery model. Learning is carefully sequenced so that pupils develop deep, connected understanding of mathematical concepts and procedures before moving on to more formal written methods.

Teaching is organised through small, coherent steps so all pupils can access the same key mathematical idea and build secure understanding over time. Carefully chosen examples, models and representations are used to expose mathematical structure, support connections and help pupils understand what they are doing, why it works and when a method is efficient.

The concrete, pictorial and abstract approach is central to this policy. Pupils begin by using practical resources, then move to drawings and visual representations, before applying abstract number sentences and formal written methods. Representations should help pupils see the mathematics, not simply provide a procedure to follow.

Alongside fluency, pupils are given regular opportunities to reason, explain their thinking, look for patterns, make connections and solve problems in different contexts. Precise mathematical language is expected so pupils can communicate their understanding clearly and choose efficient strategies with increasing independence.

Lessons should include whole-class interactive teaching, with questioning, discussion, short tasks, modelling and opportunities for pupils to practise intelligently. Variation is used to draw attention to key mathematical features by changing some elements while keeping others constant.

Where pupils do not grasp a concept or procedure, this should be identified quickly and addressed systematically so gaps do not widen. Key number facts and procedures should be practised regularly to develop automaticity and reduce cognitive load, allowing pupils to focus on reasoning and problem solving.

Inclusion and Access

This calculation policy is designed to support all pupils to access mathematics successfully. High expectations are maintained for every learner, with teaching adapted through carefully chosen resources, representations, questioning and scaffolding.

Pupils who need additional support should continue to work on the same key mathematical ideas wherever possible, using concrete resources, pictorial representations, rehearsal, precise modelling and overlearning to secure understanding.

Pupils who grasp concepts quickly should be challenged through reasoning, variation, problem solving, explaining generalisations and making connections, rather than simply being accelerated through content.

Teachers should use assessment to identify misconceptions early and provide timely support so that gaps do not widen. The CPA (Concrete, Pictorial and Abstract) approach, consistent place-value language and carefully sequenced methods are intended to reduce cognitive load and help all pupils build confidence, fluency and independence.

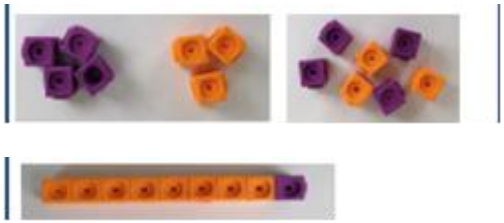
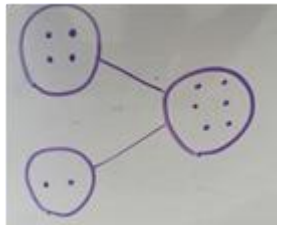
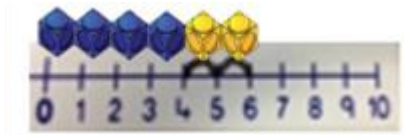
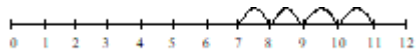
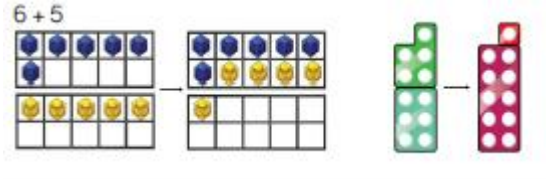
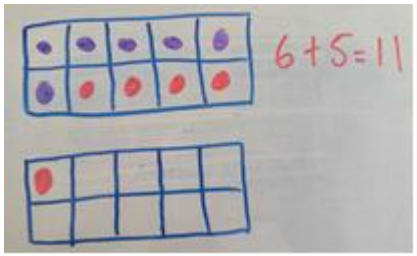
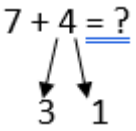
White Rose-Style Methods

When adding pictorial representations, teachers should use simple, consistent diagrams that match the concrete equipment used in lessons. Diagrams should be clear enough for pupils to copy and should show the mathematical structure, not just the answer.

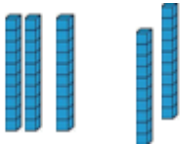
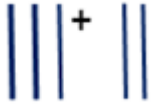
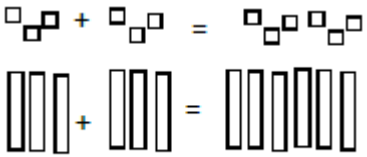
- **Part-whole models:** draw two smaller parts joining to one whole. Label each part and write the matching addition or subtraction sentence.

- **Ten frames:** draw counters in rows of five. Show how numbers are partitioned to make 10 before adding or subtracting the remaining amount.
- **Number lines:** draw jumps clearly from left to right for counting on, or right to left for counting back. Label each jump with the amount added or subtracted.
- **Bar models:** draw one whole bar split into parts. Label known and unknown parts to support comparison, difference and missing-number problems.
- **Base 10 and place value counters:** draw hundreds, tens and ones in a place value grid. Use O for ones and show any exchange clearly.
- **Arrays and equal groups:** draw equal rows, columns or groups. Label the number of groups and the number in each group, then connect to multiplication and division facts.
- **Formal written methods:** align digits carefully by place value. Show exchanges next to the relevant column and keep the ones, tens and hundreds columns clear.

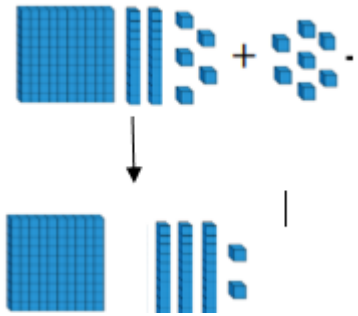
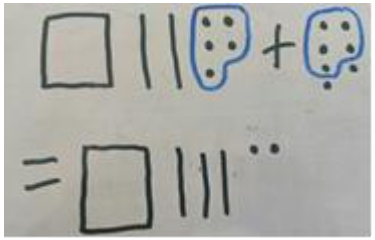
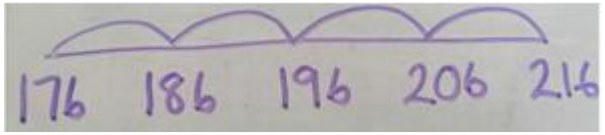
Addition — Vocabulary: add, addition, total, altogether, sum, more - Year 1

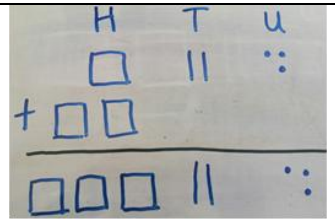
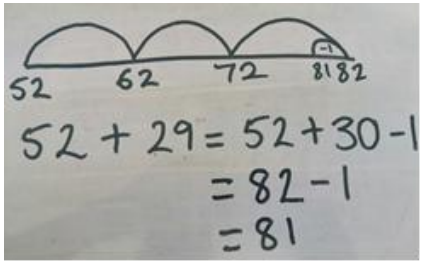
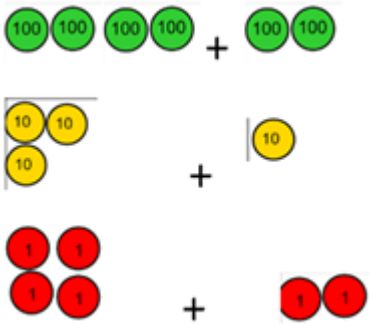
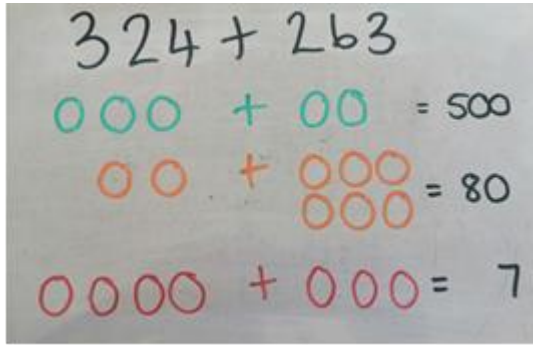
Objective/Strategy	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	Counters, cubes, Base 10 	Use drawings, counters or a part-whole model to show two parts combining to make a whole. 	4 + 3 = 7 7 = 4 + 3 Understanding the concept of the equals sign is important here.
Counting on — starting at the biggest number	Use practical resources to count on from the larger number. 	Use number tracks and number lines to count on from the larger number, encouraging pupils not to count all. 	? = 4 + 7 7 + 4 = ? Place the larger number in your head and count on.
Regrouping to make 10	Use tens frames with cubes or counters. 	Draw tens frames and counters to show how one number is partitioned to make 10, then add the remaining amount. 	7 + 4 = ? I know that 7 + 3 = 10, so I need to add 1 more to make 11. 

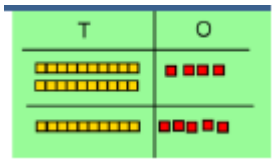
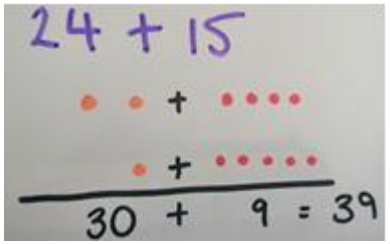
Year 2

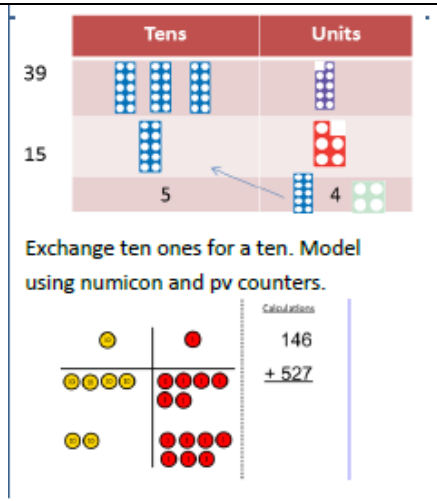
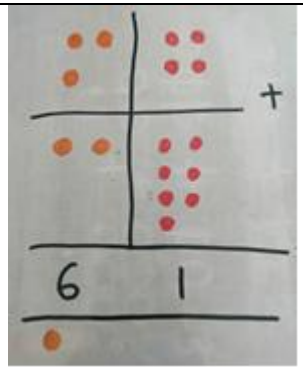
Objective/Strategy	Concrete	Pictorial	Abstract
Add multiples of 10	Use Base 10. 30 + 20 	Use representations of Base 10 tens rods to show multiples of 10 being combined. 	50 = 20 + 30 30 + 20 = 50
Use known facts	Use equipment to connect known facts to multiples of 10.  3 + 3 = 6 30 + 30 = 60	Use representations of Base 10 to connect known ones facts to related tens and hundreds facts. ... + ... 	3 + 2 = 5 So 30 + 20 = 50 Moving to 300 + 200
Add a 2-digit number and ones	Use Base 10, place value counters or Numicon to develop understanding of partitioning and place value.  41 + 8	Use representations of Base 10 and tens frames.	41 + 8 = 49 Recall of number facts must be secure by this point: 1 + 8 = 9.

KS2 Addition

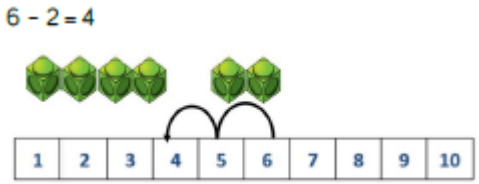
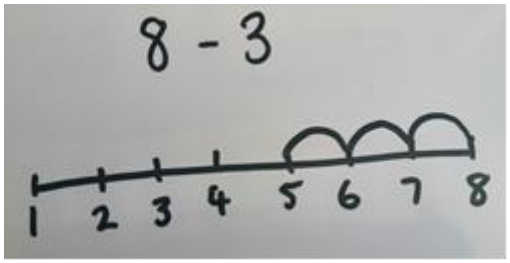
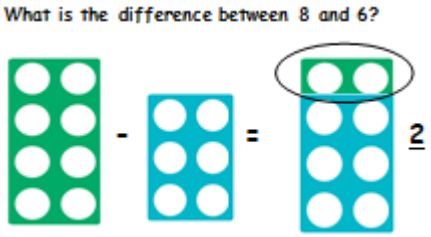
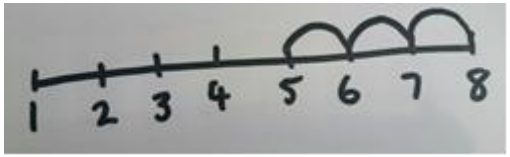
Objective/Strategy	Concrete	Pictorial	Abstract
Add a three-digit number and ones Year 3 — mental	Use Base 10, place value counters and place value grids. Explore which columns will change and discuss why. Look at where there might be an exchange. 	Draw representations using Base 10 or place value counters. 	125 + 7 Make the next 10: 125 + 5 = 130 130 + 2 = 132
Add a three-digit number and tens Year 3 — mental	Use Base 10, place value counters and place value grids. Explore which columns will change and why.	Use number squares, bar models and number lines. 	Count on in tens. 176 + 40 176, 186, 196, 206, 216
Add a three-digit number and hundreds Year 3 — mental	Use Base 10, place value counters and place value grids. Explore which columns will change and why.	Draw place value representations or use number lines.	Count on in hundreds. 176 + 300 176, 276, 376,

			476
Adjusting — add near multiples of 10, then adjust Year 3 — TO + O and TO + TO Year 4 — appropriate numbers Year 5 — add near multiples of 10 and 100, then adjust Year 6 — add near multiples of 10, 100 and 1000, then adjust	Use number lines, 100 squares and practical equipment to model adding the nearest multiple, then adjusting. Example: 32 + 9 can be modelled as 32 + 10 − 1.	Use number lines or 100 squares to count on to the nearest multiple and then adjust. 	First add the nearest multiple, then adjust. 52 + 29 = 52 + 30 − 1 82 − 1 = 81
Partition to add increasingly large numbers Year 4 — HTO + HTO, up to 4 digits Year 5 — up to 5 digits and decimals Year 6 — increasingly large numbers	Use place value equipment to partition into hundreds, tens and ones, then add and recombine. 	Draw place value counters or Base 10 equipment. 	Either partition both numbers and recombine, or partition the second number only. 358 + 73 = 358 + 70 + 3 or 300 + (50 + 70) + (8 + 3)

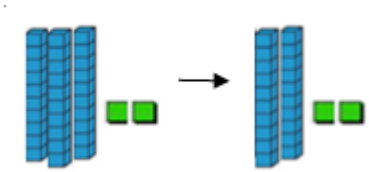
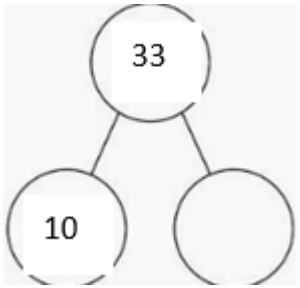
			Decimals: 35.8 + 7.3 35 + 7 = 42 0.8 + 0.3 = 1.1 42 + 1.1 = 43.1
Written methods			
Add numbers with up to three digits using a formal written method of columnar addition Expanded form first, leading to the formal column method	Use Base 10, place value counters and place value grids.  Model adding ones first — always start on the right.	Draw representations using place value counters. Link expanded form to the column method. 	Expanded form: 20 + 4 10 + 5 30 + 9 = 39 Leading to formal written method: 24 + 15 = 39
Add numbers using columnar addition with exchange Year 4 — up to 4 digits Year 5 — up to 5 digits and decimals up to 2 decimal places, including money Year 6 — adding several numbers with different	Use Base 10, place value counters and place value grids to model exchange.	Draw representations using place value counters or Base 10, exchanging ones for tens and placing them underneath the tens column.	Start with expanded form so pupils understand the exchange. 40 + 8 20 + 3 60 + 11 = 71

numbers of digits and decimals with different numbers of decimal places			Move to formal column addition: 48 + 23 = 71

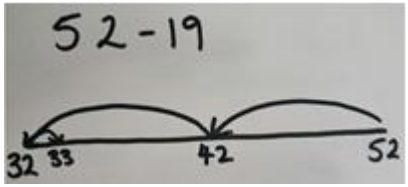
Subtraction — Vocabulary: take away, subtract, less than, difference, minus, fewer, decrease - Year 1

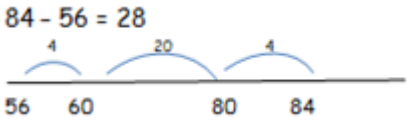
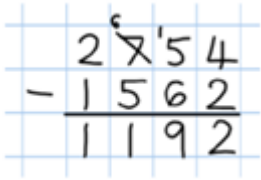
Objective/Strategy	Concrete	Pictorial	Abstract
Subtract ones	Removing objects 5 – 3 	Crossing out 	5 – 3 = 2
Counting back	Use number lines or tracks with cubes/counters to visualise subtraction. Take the cubes away as pupils count back. 	Use number lines or a 100 square, including pre-drawn number lines. 	Count back mentally or using fingers. 6 – 2 = 4 Put the big number in your head, then count back 2.
Finding the difference	Ask "How many more?" Use cubes, counters or Numicon to compare quantities. 	Draw amounts and calculate the difference. Number lines may be useful for counting on. Difference between 5 and 8 	Jack has 6 sweets and Bethany has 8. How many more does Bethany have?

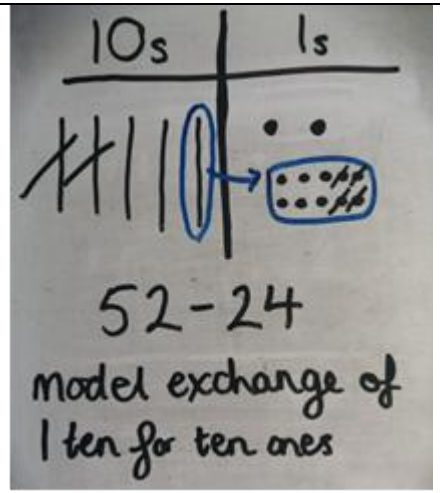
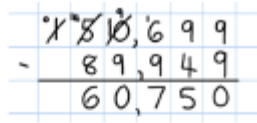
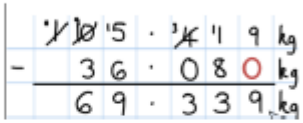
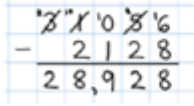
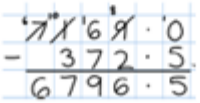
Year 2

Objective/Strategy	Concrete	Pictorial	Abstract
Take 10	Take away equipment. 	Use drawings or representations to show taking away 10. 	33 – 10 
Partitioning to subtract two 2-digit numbers	Take away equipment using place value grids to support understanding. 32 – 11	Draw and cross out Base 10.	Subtract mentally using partitioning where decomposition is not needed. 48 – 21 = 27 40 – 20 = 20 8 – 1 = 7 20 + 7 = 27

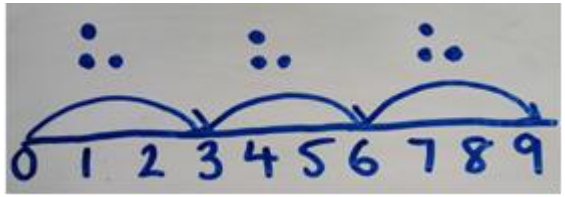
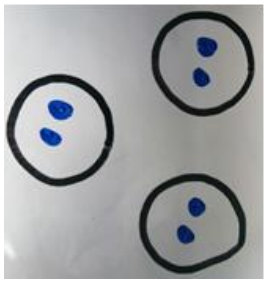
Year 3/KS2

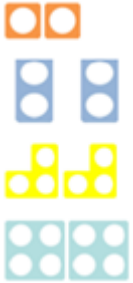
Objective/Strategy	Concrete	Pictorial	Abstract
Mental strategies			
Counting back/make ten HTO – O Year 3	Use a number line to count back. 123 – 6 Use number facts to make 10.	Draw a number line.	Count back mentally.
Counting up HTO – TO / HTO – HTO Year 3	Use a number line to count on.		
Subtract near multiples of 10, then adjust Year 4 — appropriate numbers Year 5 — subtract near multiples of 10 and 100, then adjust Year 6 — subtract near multiples of 10, 100 and 1000, then adjust	Use practical equipment to model subtracting near multiples, then adjusting.	Count back in tens on a number line or number square, then adjust by adding 1, 10 or 100. 	Count back, then adjust. 32 – 9 = 32 – 10 = 22 + 1 = 23
Written methods			

In order of teaching			
Number line to subtract (Year 3) Key skill used for subtraction, including money, throughout KS2.		Empty number line — counting on.  	
Column method — begin in Year 3 Year 3 — start with small numbers up to 1000 Year 4 — up to 4 digits Year 5 — more than 4 digits and decimals Year 6 — increasingly large numbers	Use place value grids and Base 10 to align digits by place value. Start with the ones column, then move left through tens, hundreds and beyond.	Draw representations. 54 – 22	Move to expanded form first to reinforce place value. Then move to formal column subtraction.
Column method with exchange Year 4 — up to 4 digits Year 5 — more than 4 digits and decimals Year 6 — increasingly large numbers Contexts varied	Use Base 10 or Numicon to model exchange. 52 – 24 Model exchanging 1 ten for 10 ones. Move to place value counters.	Use pictorial representations to show the exchange.	Use expanded form before formal column subtraction with exchanging. 352 – 124 Move to formal column with exchanging. 

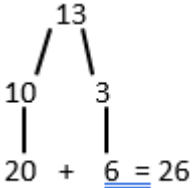
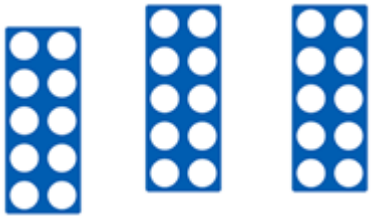
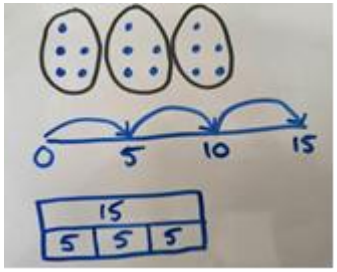
			Year 5   Year 6  Use zeros for place-holders. 

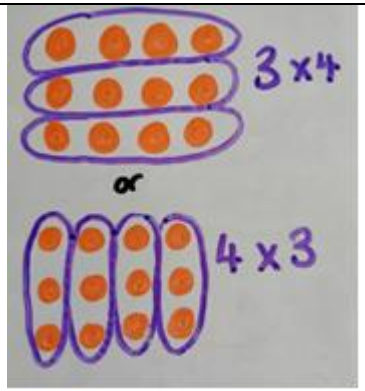
Multiplication — Vocabulary: times, double, lots of, multiply, groups of, product, equal groups - Year 1

Objective/Strategy	Concrete	Pictorial	Abstract
Repeated groups/repeated addition	Use Numicon or other practical equipment to represent repeated addition. 2 + 2 + 2 	Draw groups of the same amount. 	Count in equal groups. 2, 4, 6
Counting in groups/multiples	Skip count objects, moving each group as it is counted. 	Use pre-drawn number lines with practical equipment to support counting in groups. 	Count on fingers or use a counting stick.
Understand and make equal groups	Use cubes, counters, small-world objects or other equipment to make equal groups. 	Draw equal amounts in each group. 	Count in equal groups. 3 groups of 2 = 6 3 × 2 = 6

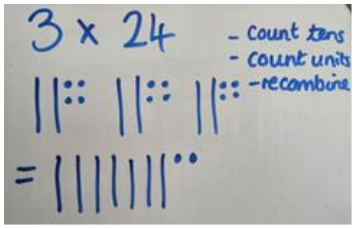
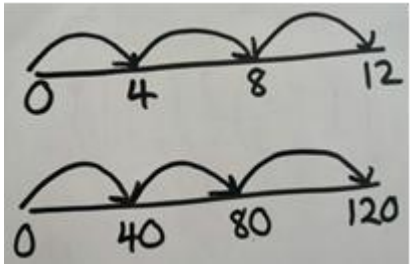
Doubling	Use manipulatives to show the same amount twice and find the total. 	Draw the amount twice. 	Count on from the starting number. Double 6 = 12
Arrays	Use simple arrays to show groups of objects. 	Draw equal groups or arrays.	Use verbal multiplication language. "I have 2 groups of 3."

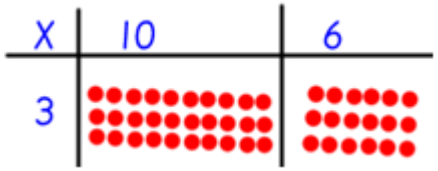
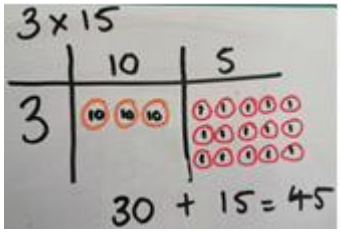
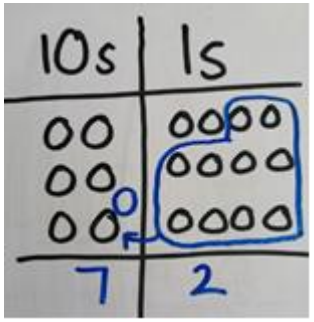
Year 2

Objective/Strategy	Concrete	Pictorial	Abstract
Doubling larger numbers	Use Base 10, Numicon, cubes or other equipment to double larger numbers. 	Draw the same number again to support doubling. 	Partition mentally.  13 = 10 + 3 Double 13 = 20 + 6 = 26
Counting in multiples 2, 5 and 10	Use repeated equipment to represent equal groups. 	Use number lines, drawings and bar models to show repeated groups. 	Count groups on fingers and complete missing numbers.
Arrays to show commutativity	Use counters, cubes or other equipment to make arrays. 2 × 5 and 5 × 2	Draw arrays and circle groups in two ways to show commutativity.	Use arrays to write related equations. 3 × 4 = 12

	 3 × 4 and 4 × 3 		

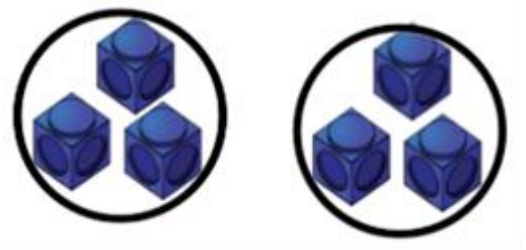
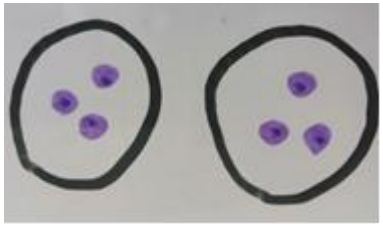
Year 3/KS2

Objective/Strategy	Concrete	Pictorial	Abstract
Mental methods and strategies			
Partitioning Year 3	Use practical equipment to partition numbers before multiplying.	Draw partitioned representations. 	15 × 3 10 × 3 = 30 5 × 3 = 15 Recombine: 30 + 15 = 45
Use known facts to multiply larger numbers Year 4/5	Use known facts and place value to scale calculations. 3 × 4 = 12 3 × 40 = 120 	Use number lines and place value grids. 	Skip count multiples and use place value grids. 3 × 4 = 12 3 × 40 = 120
Multiply by 10, 100 and 1000 Whole numbers and decimals Year 4/5	**Teaching note:** Pupils must understand the value of each column in a place value grid. As digits move to the left, each column is 10 times greater. Use cubes, counters, Base 10 and place value	Draw place value grids and model how digits move when multiplying by 10, 100 and 1000.	Mental visualisation 10 × 0.4 = 4 100 × 0.4 = 40 1000 × 0.4 = 400

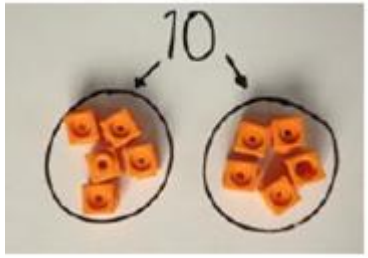
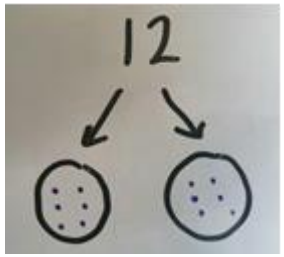
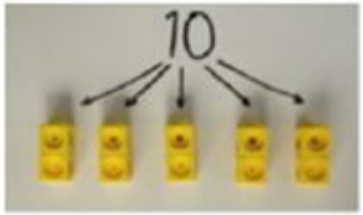
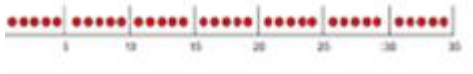
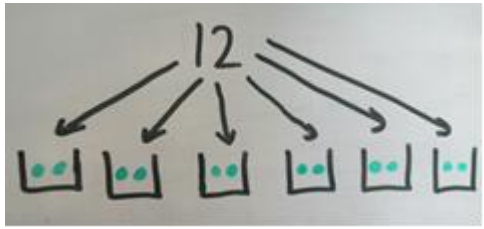
	grids. 10 × 0.4 — What does this mean?		
Grid method to multiply Year 3 — TO × O Year 4 — HTO × O Year 5 — TO × TO	Use counters, Base 10 and place value counters to link arrays with the grid method. Example: 3 × 124 300 + 60 + 12 = 372 	Draw calculations as arrays or counters. 	Use the written grid method, progressing from TO × O to HTO × O and then TO × TO where appropriate.
Column method — short multiplication Year 4 — 2- and 3-digit numbers × 1 digit Year 5 — 4 digits × 1 digit Year 6 — multi-digit numbers × 1 digit	Use practical equipment to model exchanging.	Draw the column method and show exchange. 3 × 24 	Use short multiplication with appropriate times-table facts. Year 3: TO × O using 2, 5, 10, 3, 4 and 8 times-table facts. Year 5 example: 2726 × 5 = 13630
Long multiplication Year 5 — up to 4 digits × 2 digits	Use place value counters and the grid method to show 2-digit by 2-digit multiplication as a precursor to long multiplication.		Teach the procedure carefully alongside conceptual understanding.

Year 6 — multi-digit numbers × 2 digits		**1.** Draw the layout carefully. **2.** Put in any placeholders before starting. **3.** Always start with the ones of the multiplier.

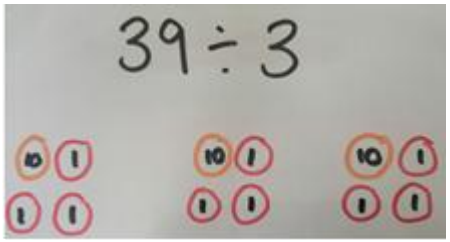
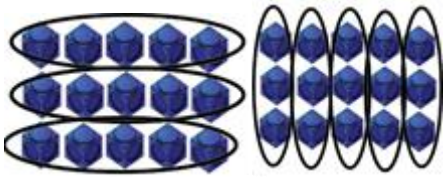
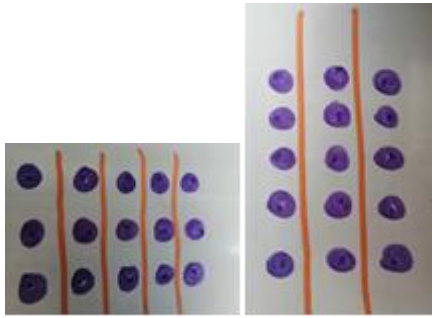
Division — Vocabulary: share, group, divide, divided by, half - Year 1

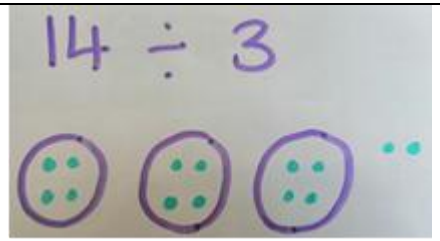
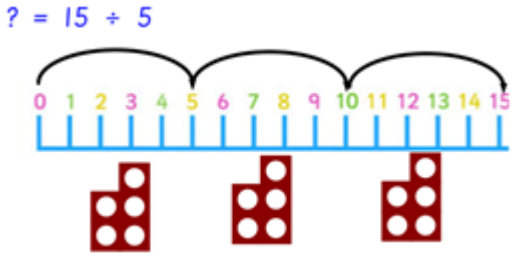
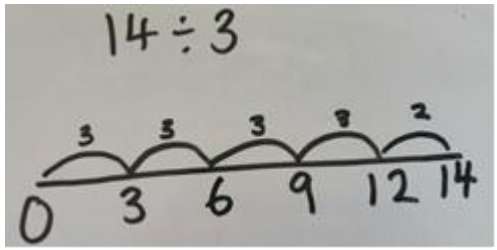
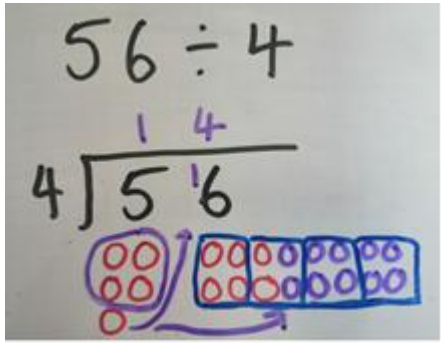
Objective/Strategy	Concrete	Pictorial	Abstract
Division as sharing	Share equipment equally into groups, using language such as "one for you, one for me, one for her". 	Draw amounts into circles or groups to show equal sharing. 	Use sharing language before formal notation. 6 shared between 2 = 3 8 shared between 4 = 2 Half of 6 = 3 Half of 8 = 4

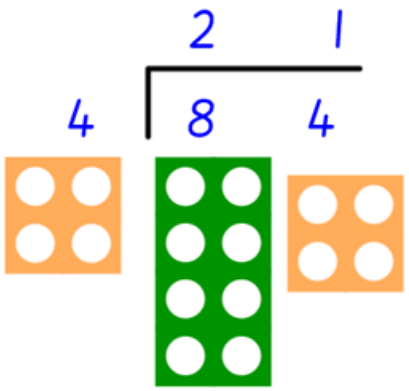
Year 2

Objective/Strategy	Concrete	Pictorial	Abstract
Division as sharing	Share equipment equally between groups. 	Draw pots and share amounts using carefully drawn dots set out in rows and columns. 	Connect sharing to division notation. 12 shared between 2 = 6 12 ÷ 2 = 6 12 = 10 + 2 Half of 10 = 5 and half of 2 = 1 5 + 1 = 6
Equal grouping	Use equipment to make equal groups and count how many groups can be made.  	Draw equal groups using dots arranged clearly in rows and columns. 	Connect equal grouping to division notation. 12 divided into groups of 3 makes 4 groups. 12 ÷ 3 = 4 24 divided into groups of 2 makes 12 groups. 24 ÷ 2 = 12

Year 3/KS2

Objective/Strategy	Concrete	Pictorial	Abstract
Sharing equally Year 3	Use counters with low numbers, then move to place value counters for TO numbers. Example: 66 ÷ 3 Move to numbers such as 96 ÷ 4 with an exchange.	Draw counters and share equally, showing exchanges for ones where needed. 	Know division facts for associated times tables appropriate to the year group and use these to solve calculations beyond 12 ×, e.g. 42 ÷ 3.
Division with arrays Year 3	Create arrays and write associated number facts and inverse facts. 15 ÷ 5 = 3 and 3 × 5 = 15 15 ÷ 3 = 5 and 5 × 3 = 15 	Draw arrays to show the relationship between multiplication and division. 	Write the number sentence and all associated facts. 15 ÷ 5 = 3 and 3 × 5 = 15 15 ÷ 3 = 5 and 5 × 3 = 15 3 = 15 ÷ 5 and 15 = 3 × 5 5 = 15 ÷ 3 and 15 = 5 × 3
Remainders Year 3	Use cubes, counters or other equipment to share into equal groups and identify how many do not make a complete group.	Use drawings and number lines to show equal groups and the remaining amount.	Calculate remainders mentally from near times-table facts. 33 ÷ 4 = 8 r 1

	13 ÷ 4 = 3 r 1 **Teaching point:** the remainder cannot be greater than the divisor.		
Written methods			
Number line, including remainders Year 3 Secure this before moving to short division.	Use division as grouping. Start with low, friendly numbers and skip count in multiples of the divisor using visual aids  .	Draw empty number lines and skip count in groups of the divisor. 	Use larger jumps where appropriate to make the method more efficient.
Short division — larger numbers Year 3 — TO ÷ O using National Curriculum times-table facts: 2, 5, 10, 3, 4 and 8 Year 4 — up to HTO ÷ O	Use Numicon, place value counters or other equipment to support understanding of grouping and exchange. Example: 84 ÷ 4	Draw equipment or counters beneath the calculation to show grouping and exchange. 	Use short division with appropriate progression by year group. Remainders may also be given as decimals where appropriate. For four-digit numbers divided by two-digit numbers, use chunking where this supports understanding. Partition the divisor to support related facts, e.g. 1 × 24 = 24, 2 × 24 = 48, 3 × 24 = 72.

Year 5 — up to 4 digits ÷ 1 digit Year 6 — 4 digits ÷ 2 digits, where appropriate			**Year 3** **Year 4** 1 9 r 1 — 5 ⟌ 9⁴6 1 3 0 r 3 — 4 ⟌ 5 ¹2 3 **Year 5** 9 5 4 r4 or 954½ — 8 ⟌ 7 6 5 2 *Including decimals* 1 8 9 . 2 — 5 ⟌ 9 ⁴4 ⁴6 . ¹0 **Year 6** 0 2 1 r 10 — 15 ⟌ 3³2 ²5 0 2 1 0 r 21 — 24 ⟌ 5⁵0²6²1