KIWI PRIMARY SCHOOL CALCULATION POLICY

Calculation Policy 2023-24

The following Calculation Policy has been largely adapted from the White Rose Maths Calculation Policy, with additional material from NCTEM and Third Space Learning, and meets requirements of the National Curriculum 2014 for the teaching and learning of mathematics, in accordance with an increased emphasis on fluency and mastery of concepts.

It is designed to provide pupils with a clear and smooth progression of learning through KSI and KS2 and ensure that the teaching of calculation methods remains consistent across the 4 operations of addition, subtraction, multiplication and division. The consistent use of the CPA (concrete, pictorial, abstract) approach helps children develop mastery across all the operations in an efficient and reliable way. This policy shows how these methods develop children's confidence in their understanding of both written and mental methods.

The school calculation policy builds progressively from the content and methods established in EYFS, with a recognition that concrete and pictorial representations of problems continue to play a valuable role throughout all key stages.

Age-stage expectations - The calculation policy is organised according to age-stage expectations as set out in the National Curriculum (2014); however, we recognise that pupils need to be taught at an appropriate level 'based on the security of pupil's understanding and their readiness to progress to the next stage' (National Curriculum). This 'readiness to progress' is a clear focus at this challenging time and there will be a clear emphasis on recapping and reviewing methods from previous years where needed.

Context for calculation - It is crucial that children are given real-life contexts and problems in which to use and apply their calculation methods. Children subsequently develop a more secure understanding of the purpose of calculations and learn to choose their operations with accuracy. This is a priority in an increasingly-challenging curriculum, with its focus on mastery.

Choosing a calculation Method - Children must be taught and encouraged to use a simple process in deciding what approach to take to a calculation, ensuring that they select the most appropriate method for the problem, whether mental or written. Children need to be comfortable with a wide variety of strategies and representations in order to demonstrate this.

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Key Vocabulary Progression Chart

EYFS	
Number & Place Value	Number , zero, one, two, three to twenty, none, count (on/up/to/from/down), before, after, more, less, least, greater, ones, tens, numeral
Addition & Subtraction	Number bonds, number line, add, more, plus, make, sum, total, altogether, inverse, double, half, subtract, take away, minus
Year 1	
Number & Place Value	Zero, one, two, three to twenty, and beyond, many, few, fewer, fewest, smallest, lesser , equal to, the same as , odd, even, pair, ten more/less, digit, figure(s), compare (In) order/a different order, size, value, between, halfway between, above, below
Addition & Subtraction	Near doubleHalve Equals, is the same as (including equals sign) Difference between How many more to make...? How many more is...than...? How much more is...? How many fewer is...than.? How much less is...?
Multiplication & Division	Odd, even Count in twos, threes, fives Count in tens (forwards from/backwards from) How many times? Lots of, groups of Once, twice, three times, five times Multiple of, times, multiply, Repeated addition Double, halve Share, share equally Group in pairs, threes, etc. Equal groups of Divide, left, left over
Year 2	
Number & Place Value	Numbers to one hundred Hundreds Partition, recombine Hundred more/less
Four Operations	Array, row, column Multiply by Divided by Inverse
Year 3	
Number & Place Value	Numbers to one thousand
Addition & Subtraction	Column addition and subtraction

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Multiplication & Division	Product Multiples of four, eight, fifty and one hundred
Year 4	
Number & Place Value	Tenths, hundredths Decimal (places) Round (to nearest) Thousand more/less than Negative integers Count through zero Roman numerals (I to C)
Multiplication & Division	Multiplication facts (up to 12x12) Division facts Inverse Derive
Year 5	
Number & Place Value	Powers of 10
Addition & Subtraction	Efficient written method
Multiplication & Division	Factor pairs Composite numbers, prime number, prime factors, square number, cubed number Formal written method
Year 6	
Number & Place Value	Numbers to ten million
Addition & Subtraction	Order of operations BIDMAS (Brackets, Indices, Division, Multiplication, Addition, Subtraction)
Multiplication & Division	Order of operations BIDMAS (Brackets, Indices, Division, Multiplication, Addition, Subtraction)Common factors, common multiples

Kiwi Primary School Calculation Policy: MULTIPLICATION

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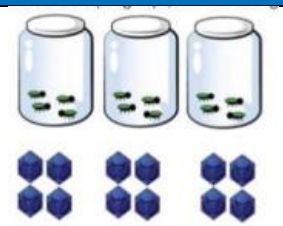
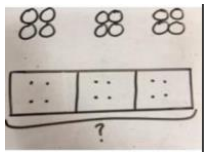
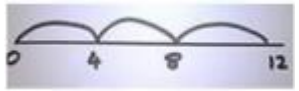
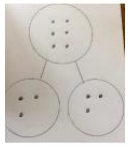
Year 1

Representation models used in year 1 : Part-whole, bar model, number bead strings, numberlines

Objective/Strategy	Concrete	Pictoral	Abstract
Repeated grouping/ repeated addition		Children to represent the practical resources in a picture and use a bar model 	Alongside concrete/pictorial $3 \times 4 = 12$ $4 + 4 + 4 = 12$
Number lines to show repeated groups	Using a bead string 	Represent this pictorially alongside a number line 	Alongside concrete/pictorial Abstract number line- three jumps of four 
Doubling	Using Numicon with part-whole model 	Using dots with part-whole model 	Using numbers with part- whole model 
STEM Sentences	The whole is_____. There are ___ equal groups with ___ in each group.		

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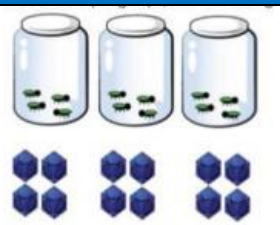
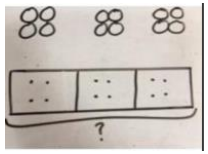
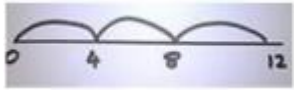
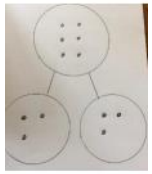
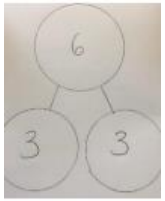
Year 2 Representation models used in year 1 : Part-whole, bar model, number bead strings, numberlines			
Objective/Strategy	Concrete	Pictoral	
Repeated grouping/repeated addition		Children to represent the practical resources in a picture and use a bar model 	TEACHER MODELLED Alongside concrete/pictorial $3 \times 4 = 12$ $4 + 4 + 4 = 12$
Numberlines to show repeated groups	Using a bead string 	Represent this pictorially alongside a number line 	TEACHER MODELLED Alongside concrete/pictorial Abstract number line- three jumps of four 
Doubling	Using Numicon with part-whole Model 	Using dots with part-whole model 	Using numbers with part- whole model 

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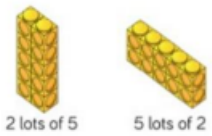
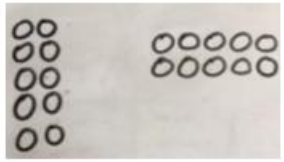
Arrays	Counters and other resources	Represent arrays pictorially	Use arrays to write and interpret a range of Calculations $10 = 2 \times 5$ $5 \times 2 = 10$ $2 + 2 + 2 + 2 + 2 = 10$ $10 = 5 + 5$
	$2 \times 5 = 5 \times 2$  2 lots of 5 5 lots of 2		

STEM Sentences	The whole is_____. There are ___ equal groups with ___ in each group.

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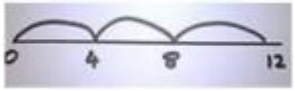
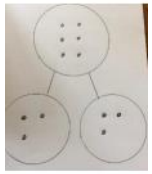
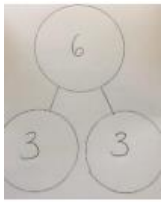
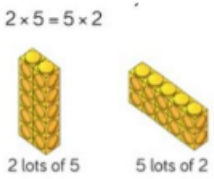
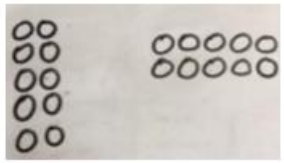
Year 3 Representation models used in year 3: Part-whole, bar model, number bead strings, numberlines grid method			
Objective/Strategy	Concrete	Pictoral	
Number lines to show repeated groups	Using a bead string 	Represent this pictorially alongside a number line 	Alongside concrete/pictorial Abstract number line showing three jumps of four 
Doubling	Using Numicon with part-whole model 	Using dots with part-whole model 	Using numbers with part whole model 
Arrays to illustrate commutivity	Counters and other resources 	Represent arrays pictorially 	Use arrays to write and interpret a range of calculations 10 = 2 × 5 5 × 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5

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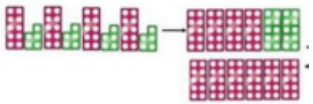
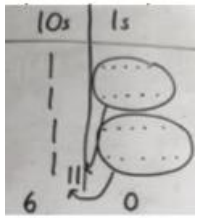
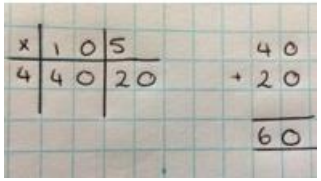
Partition to multiply	Using numicon, base 10, place value counters or Cuisenaire rods 	Children to represent the concrete pictorially 	Use grid method 
STEM Sentences	The whole is_____. There are ___ equal groups with ___ in each group. The product is ____ There are ___ equal groups of ____		

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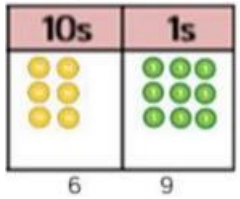
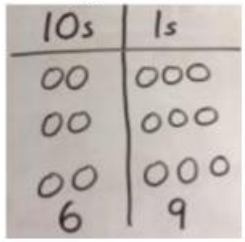
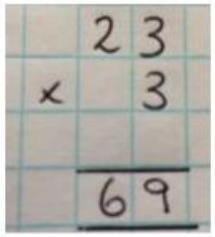
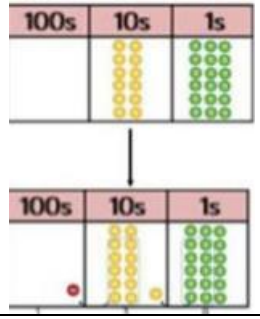
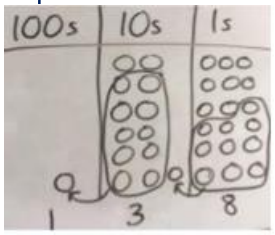
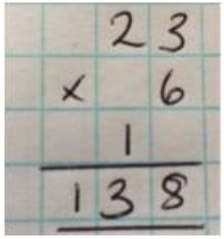
Year 4

Representation models used in year 4 : Part-whole, bar model, number bead strings, numberlines grid method, formal methods

Objective/Strategy	Concrete	Pictoral	
Formal Method (no exchanging)	With place value counters 	Represent the counters pictorially 	Use of formal method 
Formal Method (exchanging required)	With place value counters 	Represent the counters pictorially 	Use of formal method 
STEM Sentences	The whole is_____. There are ___ equal groups with ___ in each group. The product is _____ There are ___ equal groups of __		

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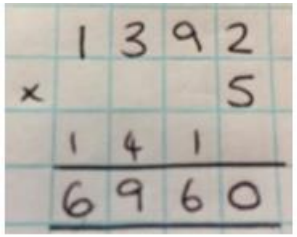
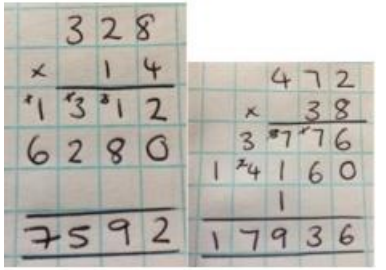
Year 5

Representation models used in year 5 : Place value counters, place value denes, place value chart, column method

Objective/Strategy	Concrete	Pictoral	
Short multiplication			Formal method 
Long Multiplication			Formal method 
STEM Sentences	The whole is_____. There are ___ equal groups with ___ in each group. The product is ____ There are ___ equal groups of __		

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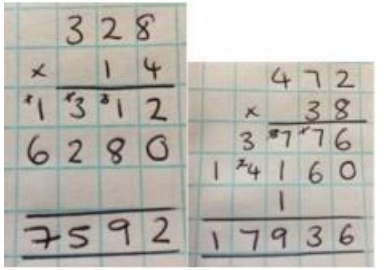
<table>
<tr><th colspan="4">Year 6
Representation models used in year 6 : Place value counters, place value denes, place value chart, column method</th></tr>
<tr><th>Objective/Strategy</th><th>Concrete</th><th>Pictoral</th><th></th></tr>
<tr><td>Long Multiplication</td><td></td><td></td><td>Formal method
  </td></tr>
<tr><td>Using known facts</td><td></td><td></td><td>7 x 3 = 21
0.7 x 3 = 2.1
0.7 x 0.3 = 0.21
70 x 3 = 210
70 x 30 = 2100</td></tr>
<tr><td colspan="2">STEM Sentences</td><td colspan="2">The whole is_____.

There are ____ equal groups with ____ in each group.

The product is _____ There are ____ equal groups of ___</td></tr>
</table>

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