Streethay Primary School

Year 2 Calculation Policy

Main Principles

Scan QR codes to be directed to the MNP website with further information and videos.

What is maths mastery?

Teaching maths for mastery is a transformational approach to maths teaching which stems from high performing Asian nations such as Singapore. When taught to master maths, children develop their mathematical fluency without resorting to rote learning and are able to solve non-routine maths problems without having to memorise procedures.

Concrete, pictorial, abstract (CPA)

Concrete, pictorial, abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths. Developed by American psychologist, Jerome Bruner, the CPA approach is essential to maths teaching in Singapore.

Number bonds

Number bonds are a way of showing how numbers can be combined or split up. They are used to reflect the 'part-part-whole' relationship of numbers.

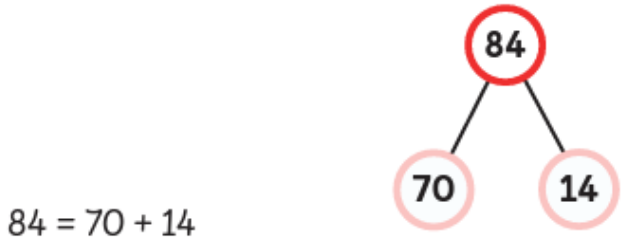
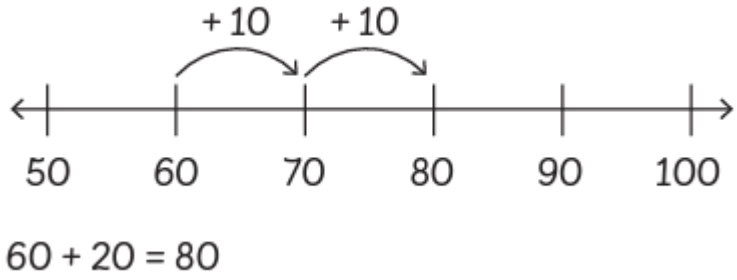
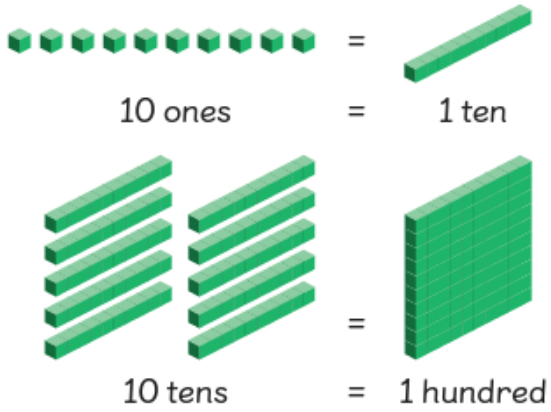
Bar modelling

The bar model method is a strategy used by children to visualise mathematical concepts and solve problems. The method is a way to represent a situation in a word problem, usually using rectangles.

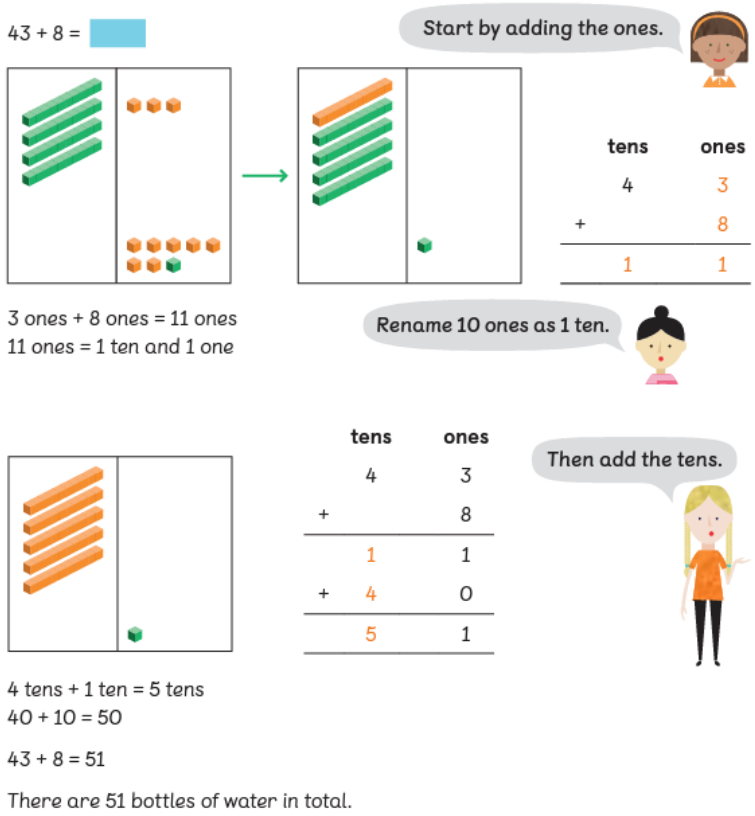
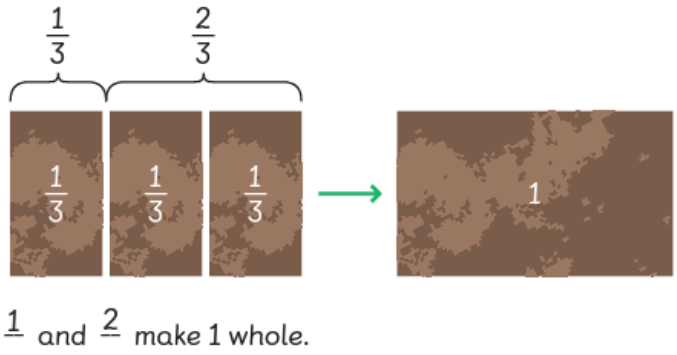
Fractions

In Singapore, the understanding of fractions is rooted in the Concrete, Pictorial, Abstract (CPA) model, where children use paper squares and strips to learn the link between the concrete and the abstract. At the heart of understanding fractions is the ability to understand that we're giving an equal part a name.

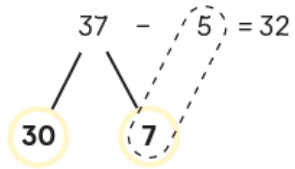
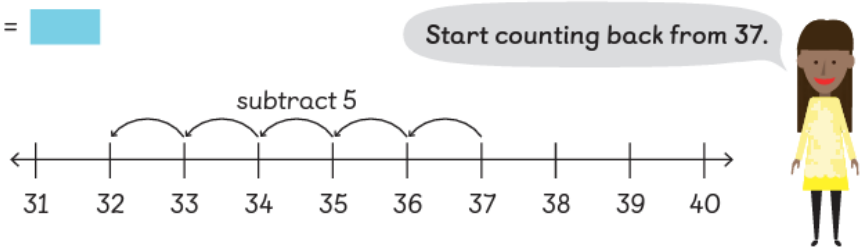
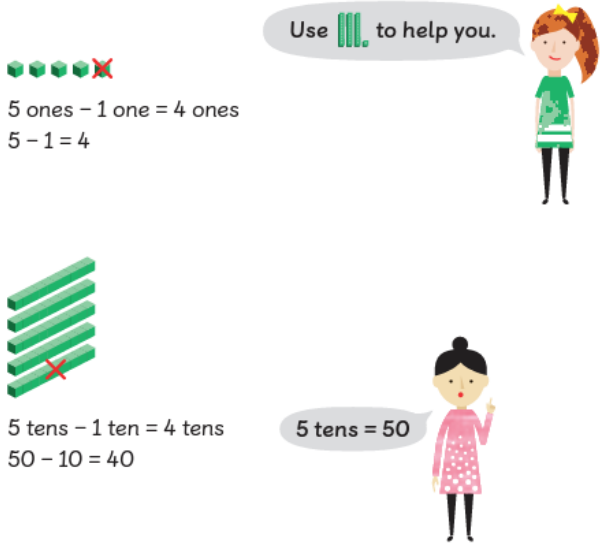
Progression in Addition—Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Part-part whole		This is a mathematical structure that underpins all addition situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation
2	Counting on using a number line		The use of the number line is further developed when counting starts from a given number, relying on pupils' ability to locate and count from a given number, including starting from a 2-digit number. Initially a 1-digit number is added to a 2-digit number, then this progresses to a number line shown with intervals of 10 when adding 2-digit numbers that do not have any ones.
2	Base 10 Blocks		The use of base 10 blocks provides a representation of the place value, primarily of 2-digit numbers. This representation is related to the formal written method but also encourages pupils to use their understanding of adding the same noun to add 2-digit numbers. For example, 20 + 30 can be understood as 2 tens + 3 tens. The sum of these numbers is 50 or 5 tens. An understanding of place value will support addition as well as subtraction, multiplication and division.

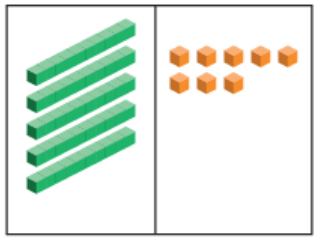
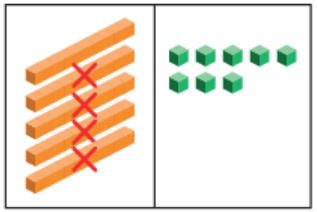
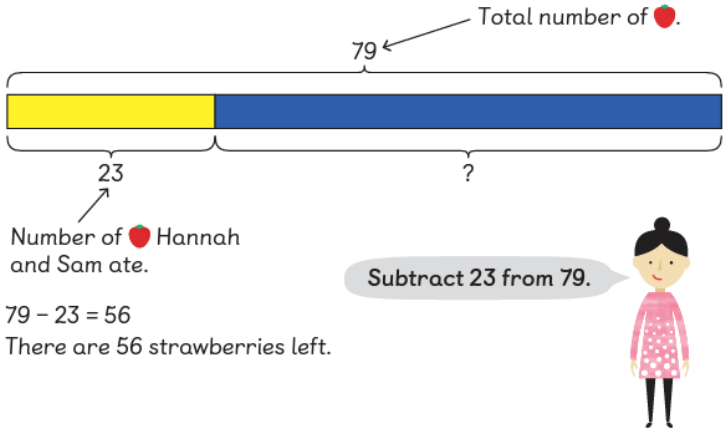
Progression in Addition—Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Formal written method		This is a procedural method that relies on a pupil's conceptual understanding of addition. This begins without renaming and progresses to the renaming of 10 ones into 1 ten. Pupils understand that at this stage, they start with the addition of the ones before they add the tens. This method is supported with base 10 block representation. The formal written method is always accompanied by a written equation to ensure that the relationship between the representations is made.
2	Adding Fractions		Pupils use their understanding of adding the same noun when adding fractions through a written sentence. Fractions with the same denominator are added using a '[ ] and [ ] make [ ]' structure.

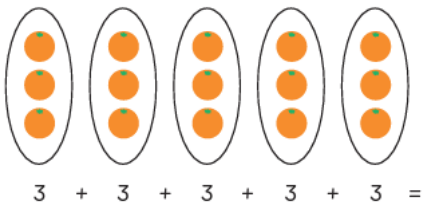
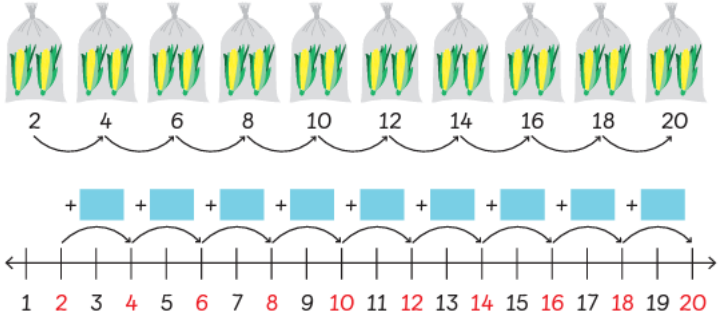
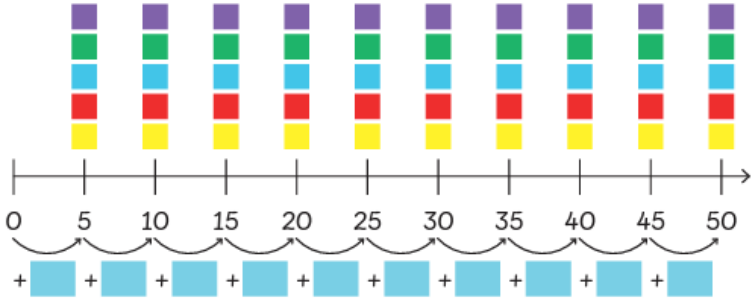
Progression in Subtraction—Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Part-part whole	 7 – 5 = 2 37 – 5 = 32	This is a mathematical structure that underpins subtraction situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
2	Counting back using a number line	37 – 5 = ☐  37 – 5 = 32	The use of the number line is further developed when counting back starts from a given number, relying on pupils' ability to locate and count back from a given number, including starting from a 2-digit number. Initially a 1-digit number is subtracted from a 2-digit number, then this progresses to a number line shown with intervals of 10 when subtracting 2-digit numbers that do not have any ones.
2	Base 10 Blocks		The use of base 10 blocks provides a representation of the place value primarily of 2-digit numbers. This representation is related to the formal written method but also encourages pupils to use their understanding of subtracting the same noun to subtract 2-digit numbers. For example, 50 – 30 can be understood as 5 tens – 3 tens. The difference between the numbers is 20 or 2 tens. An understanding of place value will support subtraction as well as addition, multiplication and division.

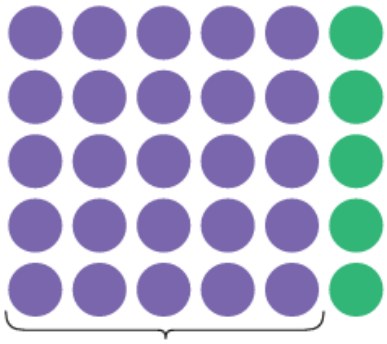
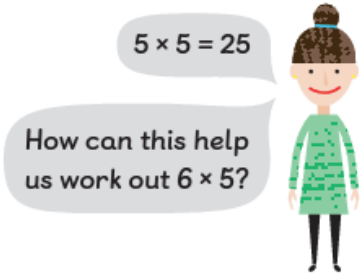
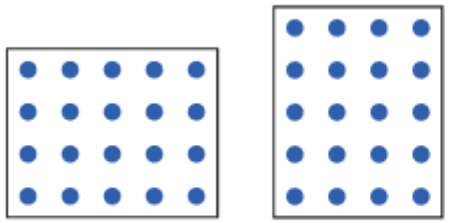
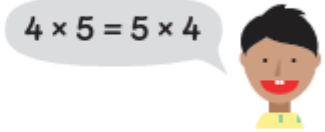
Progression in Subtraction —Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Formal written method	 8 ones − 0 ones = 8 ones 8 − 0 = 8 tens ones 5 8 − 4 0 8  5 tens − 4 tens = 1 ten 50 − 40 = 10 58 − 40 = 18 tens ones 5 8 − 4 0 1 8	This is a procedural method that relies on a pupil's conceptual understanding of subtraction. Initially, this begins without renaming and progresses to the renaming of 1 ten into 10 ones. Pupils understand that at this stage, they start with the subtraction of the ones before they subtract the tens. This method is supported with base 10 block representation. The formal written method is always accompanied by a written equation to ensure that the relationship between the representations are made.
2	Subtraction word problems	 79 − 23 = 56 There are 56 strawberries left.	Pupils develop an understanding of situations and problems that require subtraction.

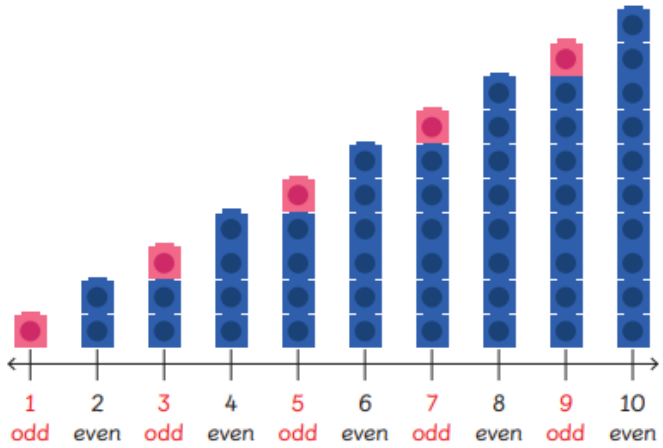
Progression in Multiplication —Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Equal groups	  There are 15 oranges in total. 5 threes = 15 5 groups of 3 = 15 5 × 3 = 15 5 times 3 equals 15 We read 5 × 3 = 15 as 5 times 3 equals 15. 	Pupils learn to recognise groups that are equal in quantity, initially using like items and then progressing to different items. Pupils understand that equal groups can be represented by concrete items, diagrams and written numbers. In Year 2, the progression to multiplication from repeated addition is shown as 3 + 3 + 3 + 3 + 3 being equal to 5 groups of 3 and 5 groups of 3 being equal to 5 × 3. Pupils read 5 × 3 as 5 groups of 3.
2	Counting in 2s, 5s and 10s		When a pupil knows that the size of a group is 2, 5 or 10 and the group size remains consistent, they can count in multiples of 2, 5 and 10 to find the product. Counting in multiples is supported by representation on a number line.
2	Number line		Counting in multiples is shown on a number line. The increasingly abstract nature of the number line is shown as intervals change from 1 to 2, 5 and 10.

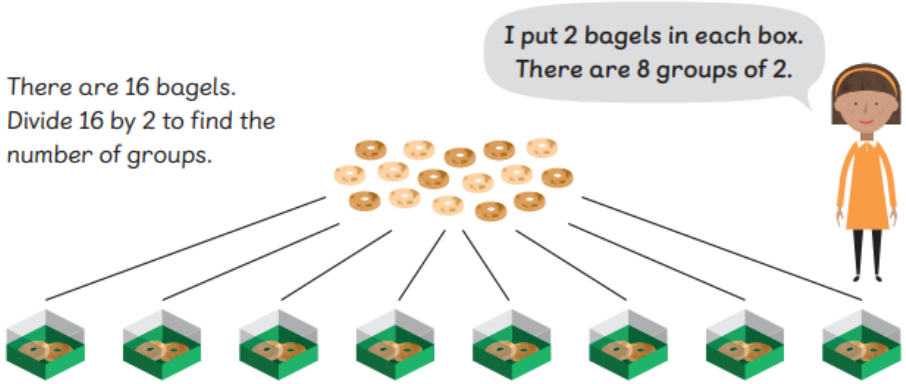
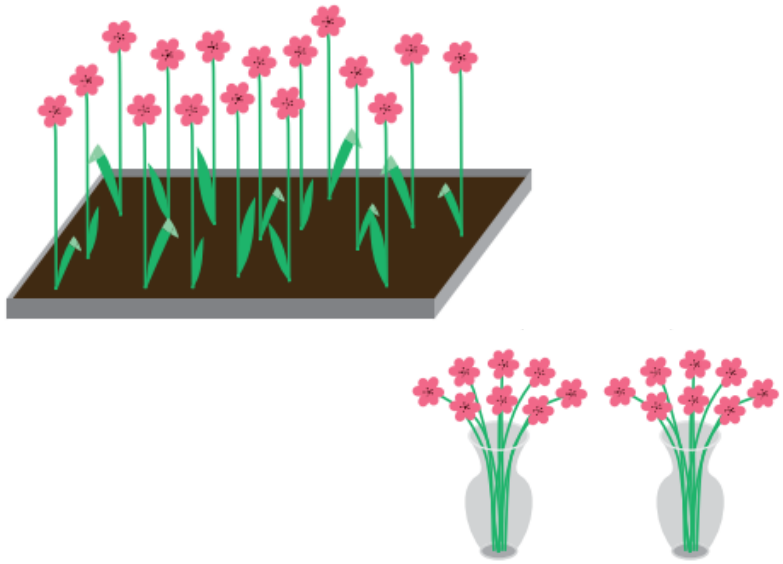
Progression in Multiplication —Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Associated facts	6 × 5 =   6 × 5 = 25 + 5 = 30	As pupils become more fluent and their understanding of their times tables increases, they are expected to use this knowledge to calculate associated facts. A pupil should be able to relate 10 × 5 to 9 × 5, knowing that the latter expression is 1 group of 5 less. So, 9 × 5 = 50 – 5
2	Commutativity	 4 × 5 = 20 5 × 4 = 20 	Pupils develop an understanding of situations and problems that require subtraction.
2	Fact families	10 × 2 = 20 20 ÷ 2 = 10 2 × 10 = 20 20 ÷ 10 = 2 	Pupils relate multiplication and division and see the connection between them when completing fact families. Pupils develop an understanding that factor × factor = product and product ÷ factor = factor. Once the understanding of this is secure, pupils can relate this to both multiplication and division situations.

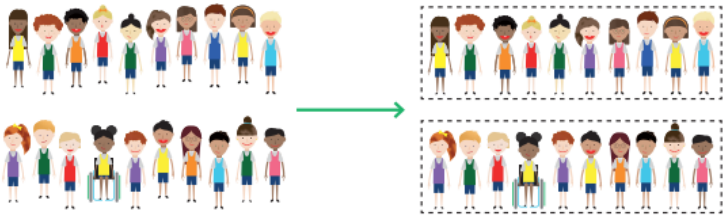
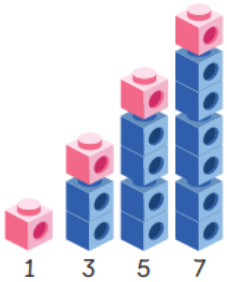
Progression in Multiplication —Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Odd and even numbers		Pupils develop an understanding that even numbers can be put into groups of 2 exactly but when odd numbers are grouped in twos, there is always 1 remaining

Progression in Division —Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Grouping		Pupils initially use grouping for division. They put items into equal groups to find the number of equal groups that can be made from a set amount.
2	Sharing	There are 16 flowers. Elliott cuts the flowers and puts them equally into 2 vases.  There are 8 flowers in each vase. 16 ÷ 2 = 8	Pupils move from division through grouping to division through sharing. They share a set amount of items equally between a number of groups. The number of groups is known and pupils find the number of items in each group.

Progression in Division —Year 2

Year Group	Topic/Strand	Representation	Key Idea
2	Division by 2, 5 and 10	20 children can be put into teams of 10.  $20 \div 10 = 2$ There are 2 equal teams. There are 2 groups of 10 children. $2 \times 10 = 20$ $10 \times 2 = 20$ $\quad 20 \div 2 = 10$ $2 \times 10 = 20$ $\quad 20 \div 10 = 2$ There is a relationship between the multiplication and division facts. This is a multiplication and division fact family.	Pupils start to make the connection between division and multiplication. They see amounts as equal groups and relate this to multiplication.
2	Odd and even numbers	 2 4 6 2 cubes can be put into a group of 2. 4 cubes can be put into groups of 2. 6 cubes can be put into groups of 2. 2, 4 and 6 are even numbers.  1 3 5 7 1 cube cannot be put into a group of 2. 3 cubes cannot be put into groups of 2. 5 cubes cannot be put into groups of 2. 7 cubes cannot be put into groups of 2. 1, 3, 5 and 7 are odd numbers.	Pupils develop an understanding that even numbers can be put into groups of 2 exactly. Numbers that can be put into groups of 2 and have 1 remaining are described as odd numbers.