Streethay Primary School

Year 1 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.

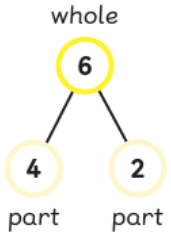
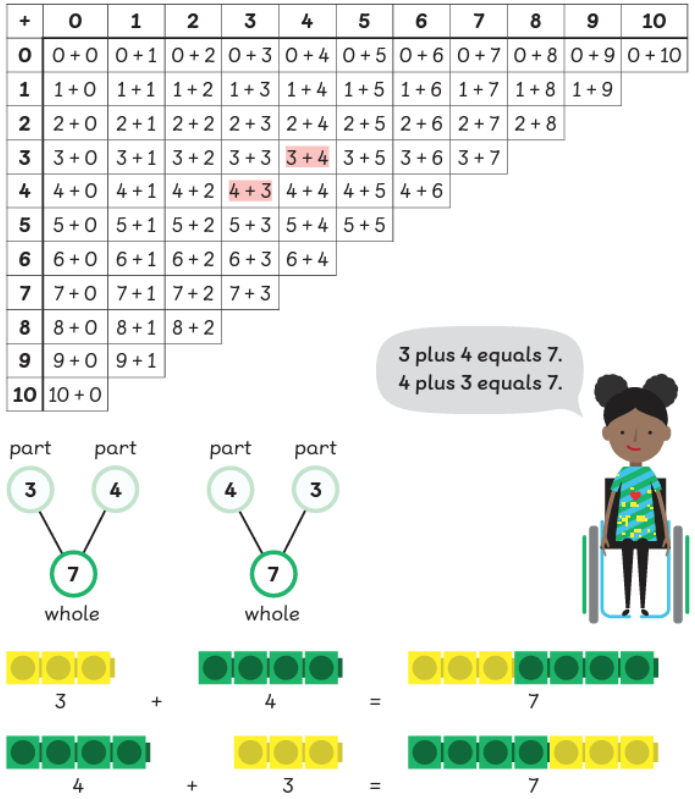
Bar modelling

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

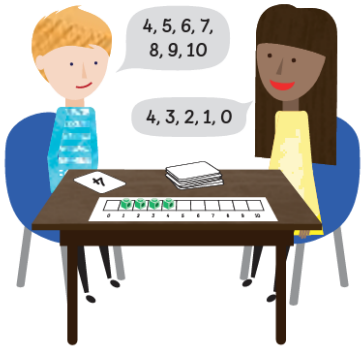
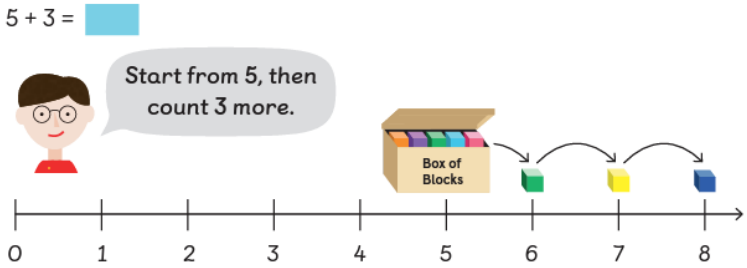
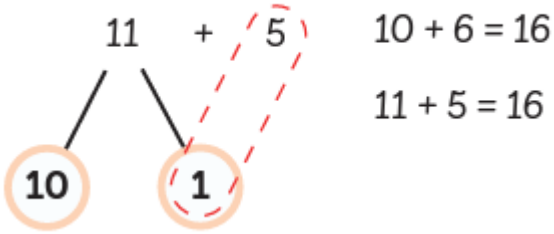
In Singapore, the understanding of fractions is rooted in the Concrete, Pictorial, Abstract (CPA) model, where children use paper squares and strips to learn the link between the concrete and the abstract. At the heart of understanding fractions is the ability to understand that we're giving an equal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

Progression in Addition—Year 1

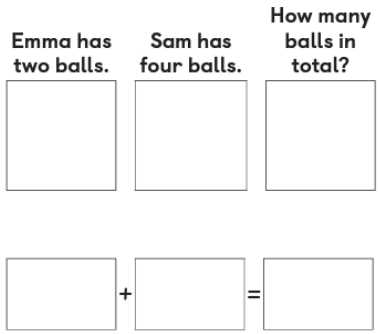
Year Group	Topic/Strand	Representation	Key Idea
1	Part-part whole		This is a mathematical structure that underpins all addition situations. Numbers can be understood in terms of their parts; understanding that the parts are part of a larger collection. Pupils develop an understanding of the parts and the whole within an equation.
1	Number bonds to 10.		Pupils develop automatic recall of number bonds to 10. This can be shown using a ten frame, a number bond diagram and written as an equation. This understanding can be related to adding tens, hundreds and so on when used with a sound understanding of place value.

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8		
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7			
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6				
5	5+0	5+1	5+2	5+3	5+4	5+5					
6	6+0	6+1	6+2	6+3	6+4						
7	7+0	7+1	7+2	7+3							
8	8+0	8+1	8+2								
9	9+0	9+1									
10	10+0										

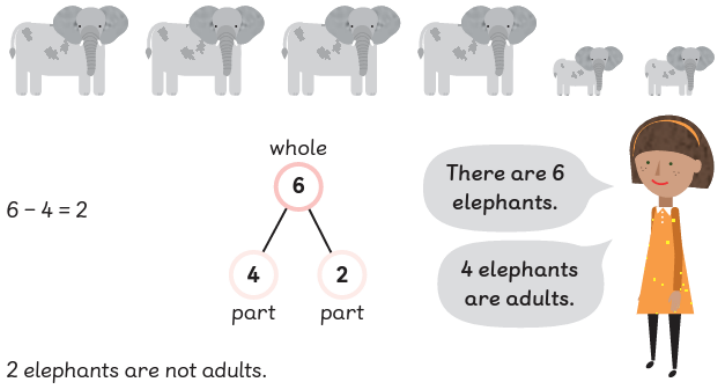
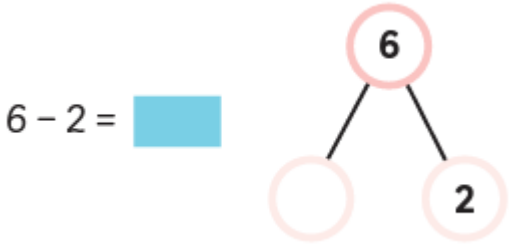
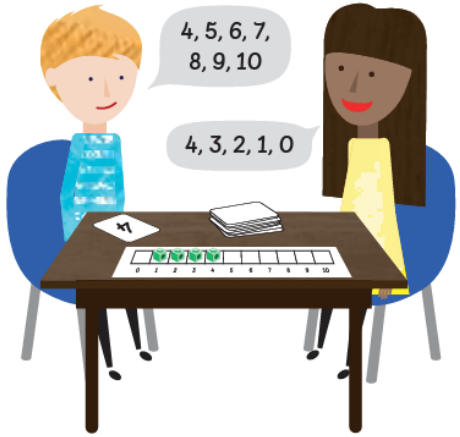
Progression in Addition—Year 1

Year group	Topic/Strand	Representation	Key Idea
1	Using a number track		Pupils are first introduced to a linear number system through the number track. This is a precursor to the number line. Pupils may benefit from placing items on the number track as they count and add, before moving on to use the more abstract number line.
1	Counting on using a number line		Pupils move from a number track to a number line, starting from zero and having marked increments of 1. The use of the number line is further developed when counting starts from a given number, relying on pupils' ability to locate and count on from a given number.
1	Adding by making 10.		Pupils use their part–whole understanding to rename a number into its component parts in order to make 10 within an equation. Pupils also look for combinations of numbers that make 10 in addition examples that have 3 numbers with a sum greater than 10.

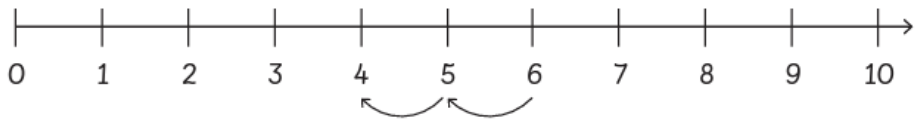
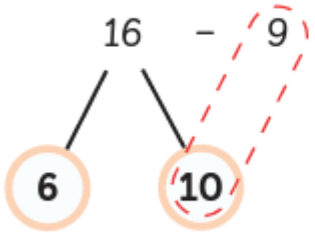
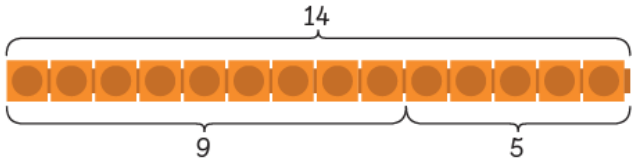
Progression in Addition—Year 1

Year Group	Topic/Strand	Representation	Key Idea
1	Addition word problems		Pupils apply their knowledge of addition within the context of word problems. The problems may involve different situations, contexts or strategies.

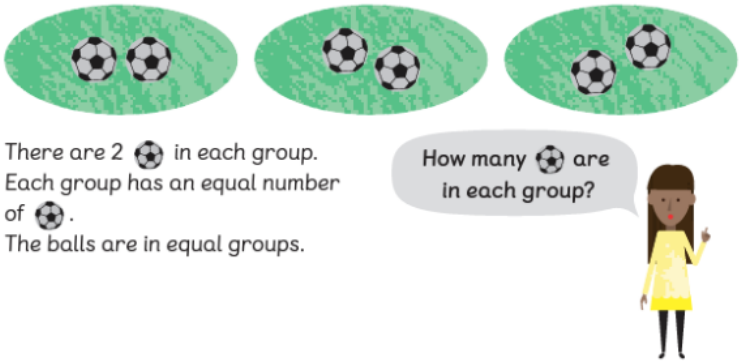
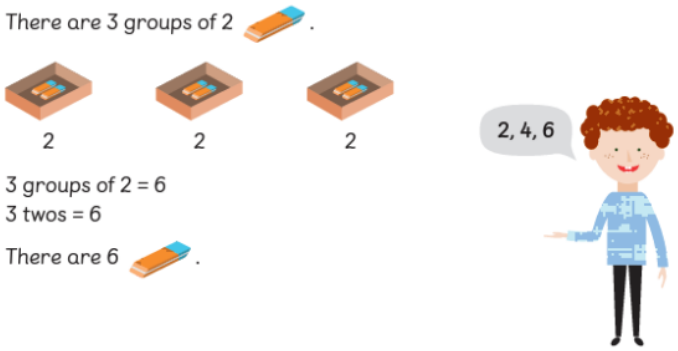
Progression in Subtraction—Year 1

Year Group	Topic/Strand	Representation	Key Idea
1	Part-part whole		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
1	Number bonds within 10		Pupils develop automatic recall of number bonds to 10. This can be shown using a ten frame, a number bond diagram and written as an equation. This understanding can be related to subtracting tens, hundreds and so on when used with a sound understanding of place value.
1	Using a number track		Pupils are first introduced to a linear number system through the number track. This is a precursor to the number line. Pupils may benefit from placing items on the number track as they count and subtract before moving on to use the more abstract number line.

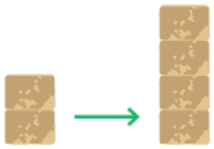
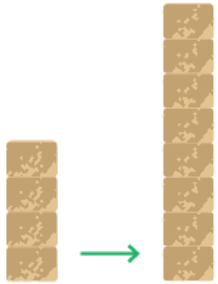
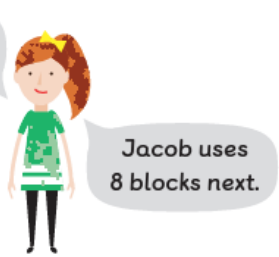
Progression in Subtraction—Year 1

Year group	Topic/Strand	Representation	Key Idea
1	Counting back using a number line	 6 − 2 = 4	Pupils move from a number track to a number line, starting from zero and having marked increments of 1. 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.
1	Subtracting from 10.	 10 − 9 = 1 1 + 6 = 7 16 − 9 = 7 There are 7 logs left.	Pupils use their part–whole understanding to rename a number into its component parts in order to subtract from 10 within an equation.
1	Subtraction word problems	 14 − 9 = 5 The number of people at the bus stop. The number of people who got on the bus. The number of people left at the bus stop. There are 5 people left at the bus stop.	Pupils develop an understanding of situations and problems that require subtraction

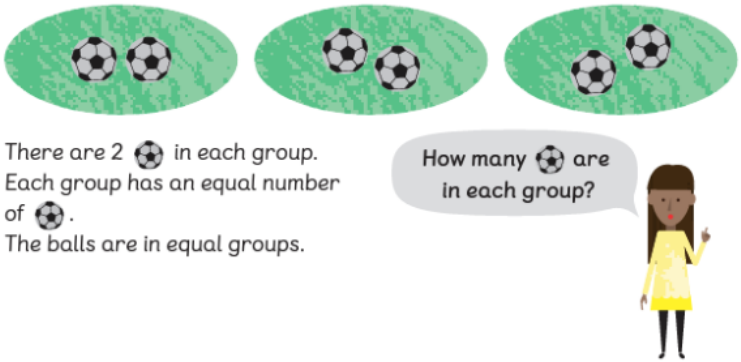
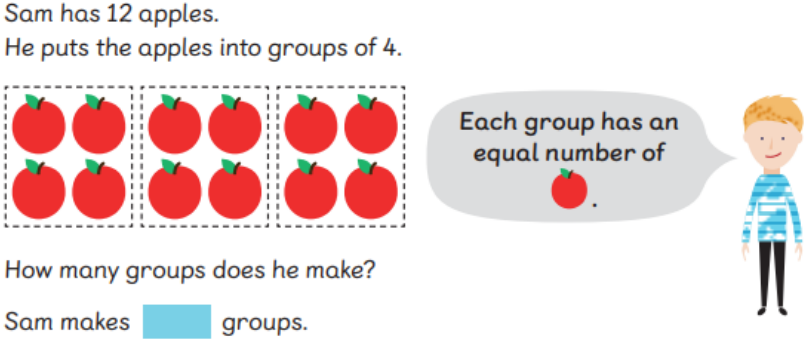
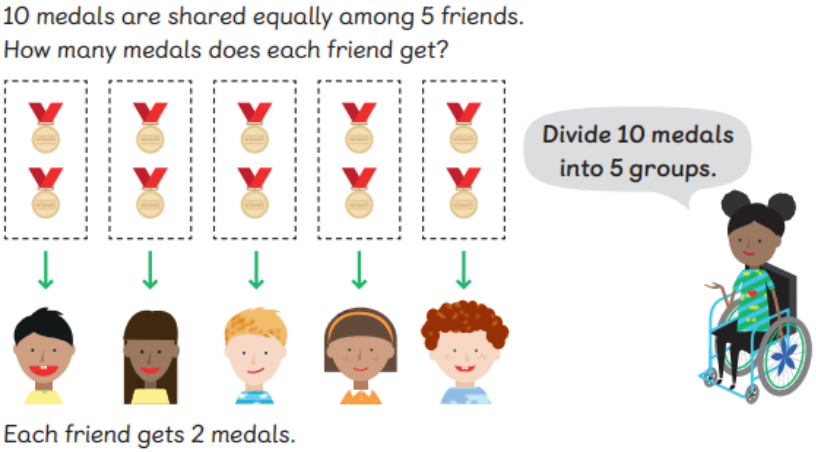
Progression in Multiplication —Year 1

Year Group	Topic/Strand	Representation	Key Idea
1	Equal groups		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. Pupils need to be secure in the abstraction principle of counting the quantity of items, regardless of the properties or characteristics of the items, in order to recognise equal groups in a range of situations.
1	Repeated Addition		Initially, multiplication is shown as the addition of equal groups. The key idea of adding like nouns still applies in multiplication. A group of 3 bananas and 3 apples does not result in 6 bananas or 6 apples. In order to add, the nouns must be the same, in this case 6 pieces of fruit. This is also true of multiplication: 2 groups of 3 pieces of fruit makes 6 pieces of fruit.
1	Counting in 2s, 5s and 10s		Pupils start to count in multiples of 2 and multiples of 10, then progress to counting in multiples of 2, 5 and 10 supported by discrete, countable representations.

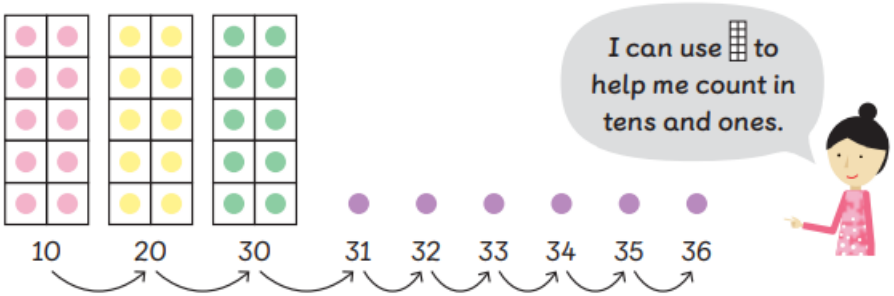
Progression in Multiplication —Year 1

Year group	Topic/Strand	Representation	Key Idea
1	Arrays	 3 rows of 5 3 fives = 15 There are 15 children altogether. 1 row of 5 = 5 2 rows of 5 = 10 3 rows of 5 =  	Pupils move from a number track to a number line, starting from zero and having marked increments of 1. 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.
1	Doubles	 double 1 = 2 ones double 1 = 2  double 2 = 2 twos double 2 = 4  double 4 = 2 fours double 4 = 8 	The diagrams used to support learning how to double numbers, not only show equal groups of 2 being added each time, but also show the pattern scaling up and each 'tower' being twice the height of the tower just before it. Pupils can develop the language associated with multiplication by describing the growing block pattern. This also provides the basis for understanding halving, in which the representation scales down.

Progression in Division—Year 1

Year Group	Topic/Strand	Representation	Key Idea
1	Equal groups		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. Pupils need to be secure in the abstraction principle of counting the quantity of items regardless of the items' properties or characteristics, in order to recognise equal groups in a range of situations.
1	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.
1	Sharing		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 1

Year group	Topic/Strand	Representation	Key Idea
1	Counting in 2s, 5s and 10s		Pupils start to count in multiples of 2 and multiples of 10, then progress to counting in multiples of 2, 5 and 10 supported by discrete, countable representations.