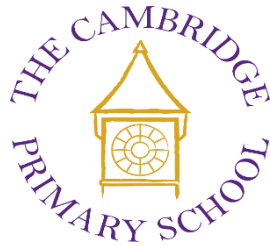# The Cambridge Primary School

Year Two

Calculations Policy

YEAR 2

MAIN PRINCIPLES

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.

YEAR 2

PLACE VALUE

6 tens

60 sixty

Count in tens.

7 tens

70 seventy

10, 20, 30, ...

8 tens

80 eighty
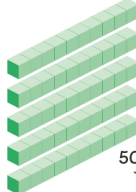
Count backwards in tens from 100.

We can count on in tens to 100 and we can count back.

52

50   2

50 and 2 make 52.

We can count in tens and ones.

50   51   52

50   51   52   53

We write 52 as fifty-two.
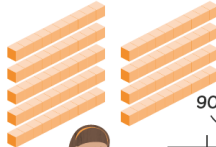
Counting in tens and ones

90 91 92 93 94 95 96 97 98 99 100

90 91 92 93 94 95 96 97 98 99 100

How many tens make 100?

Activity

We can represent two digit numbers and make number bonds

tens	ones
6	5

65

60   5
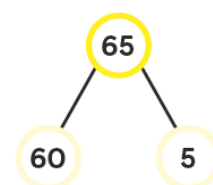
YEAR 2

PLACE VALUE

7 tens is more than 6 tens.
75 is more than 63.
75 is more than 69.
75 is the greatest.

3 ones is less than 9 ones.
63 is less than 69.
63 is the smallest.

75 > 63

63 < 69

75 ☐ 69

Is it < or >?

We can arrange the numbers in order.

75,   69,   63

greatest ⟶ smallest

63,   69,   75

smallest ⟶ greatest
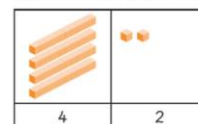
Numbers to 100   Page 9

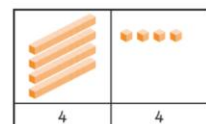We can compare numbers.

We can extend number patterns.

What is 2 more than 42?
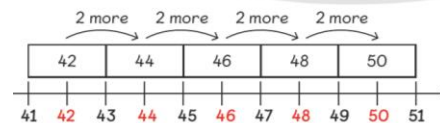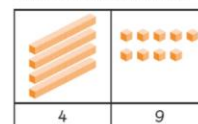
| 4 | 2 |

2 more

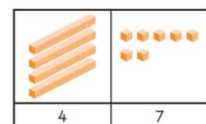| 4 | 4 |

2 more than 42 is 44.

We can make a number pattern. Each number is 2 more than the number before it.

2 more   2 more   2 more   2 more

| 42 | 44 | 46 | 48 | 50 |

41 42 43 44 45 46 47 48 49 50 51

What is 2 less than 49?

| 4 | 9 |

2 less

| 4 | 7 |

2 less than 49 is 47.

We can make a number pattern. Each number is ☐ less than the number before it.

2 less   2 less   2 less   2 less

| 49 | 47 | 45 | 43 | 41 |
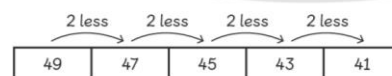
What is 3 more than 45? What is 3 more than 48?

| 4 | 5 | | 4 | 8 | | 5 | 1 |
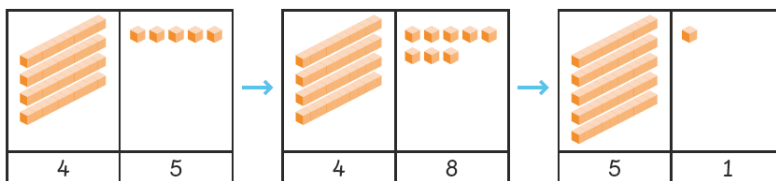
3 more than 45 is 48. 3 more than 48 is 51.
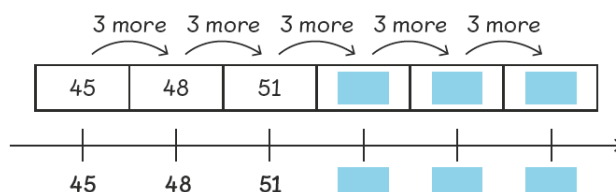
We can find the missing numbers in patterns.

3 more   3 more   3 more   3 more   3 more

| 45 | 48 | 51 | ☐ | ☐ | ☐ |

45   48   51   ☐   ☐   ☐

YEAR 2

ADDITION

Counters method:
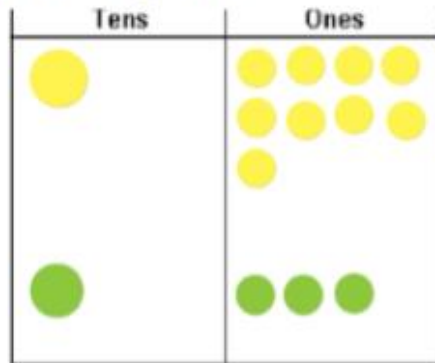
Tens	Ones

Base 10 method:

Tens	Ones

Number bond method:

19
32
13

Number bond method:

$$19 + 13 = 32$$

10 9   10 3

$9 + 3 = 12$
$10 + 10 = 20$
$20 + 12 = 32$

Number line method:

19	29	30	31	32

+10 +1 +1 +1

19   29   30   31   32

+10 +1 +1 +1

Bar model:

32	
19	13
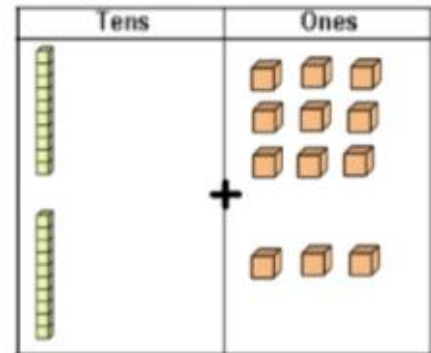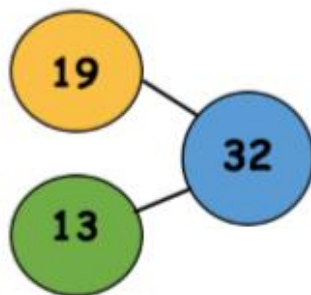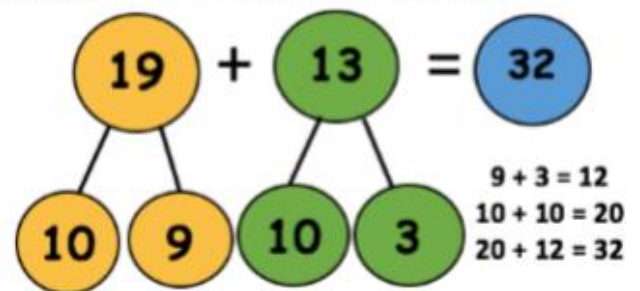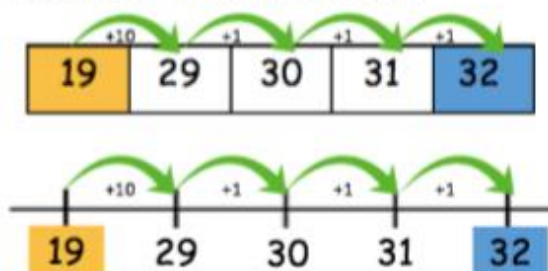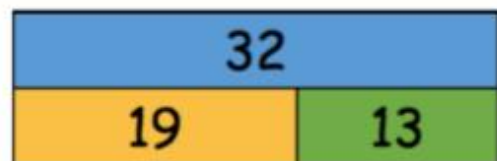
Column addition:

Without renaming:

```
  18
+ 11
----
  29
```

With renaming:

```
  19
+ 13
----
  32
   1
```

Expanded method:

```
  19
 +13
----
  12
  20
----
  32
```

Abstract calculations:

Commutative	Inverse
$19 + 13 = 32$	$32 - 13 = 19$
$13 + 19 = 32$	$32 - 19 = 13$

YEAR

SUBTRACTION

Counters method:
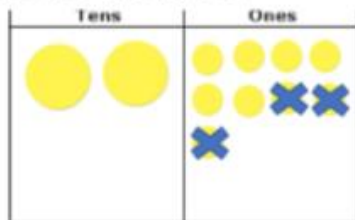
Tens	Ones

Base 10 method:

Tens	Ones

Bar model:

28	
25	3

Number line method:

25 26 27 28

25 26 27 28

Number bond method:

25   28   3

Number bond method:

28 - 3 = 25

20   8

8 - 3 = 5
20 + 5 = 25
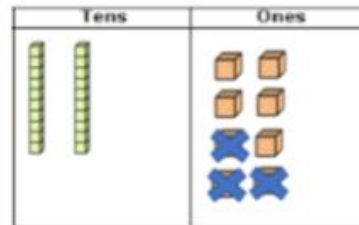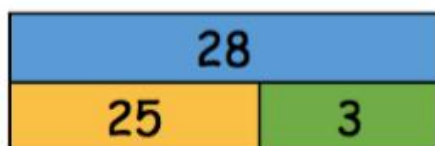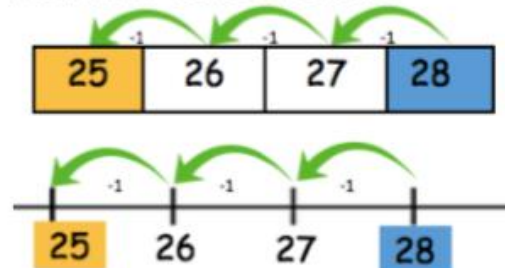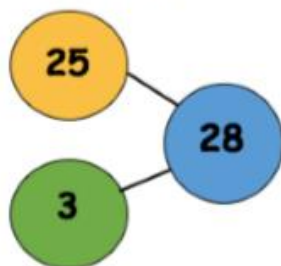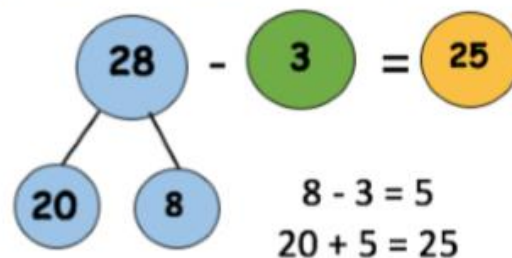
Column subtraction:

Without renaming:

$$\begin{array}{r} 28 \\ -\ 3 \\ \hline 25 \end{array}$$

With renaming:

$$\begin{array}{r} {}^{1}2{}^{13}\!\!\!\not3 \\ -\ 19 \\ \hline 4 \end{array}$$

Expanded method:

$$\begin{array}{r} 29 \\ -14 \\ \hline 5 \\ 10 \\ \hline 15 \end{array}$$

Abstract calculations:

Commutative	Inverse
25 + 3 = 28	28 − 3 = 25
3 + 25 = 28	28 − 25 = 3

YEAR 2

MULTIPLICATION

Repeated addition:

$3 + 3 + 3 + 3 = 12$

Number line method:

$+3$ $+3$ $+3$ $+3$

| 0 | 3 | 6 | 9 | 12 |

Groups of:

4 groups of 3 is 12

Multiplication:

$4 \times 3 = 12$

Grouping Method:
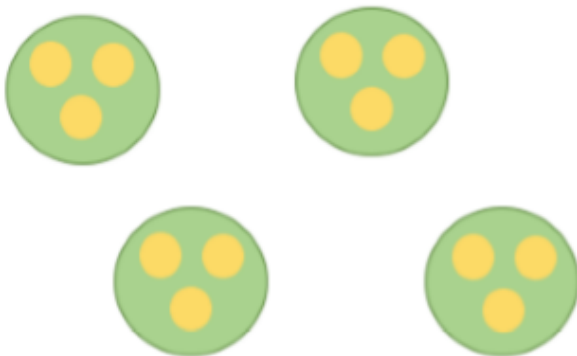
Abstract calculations:

Commutative
$3 \times 4 = 12$
$4 \times 3 = 12$

Making a family of multiplication and division facts
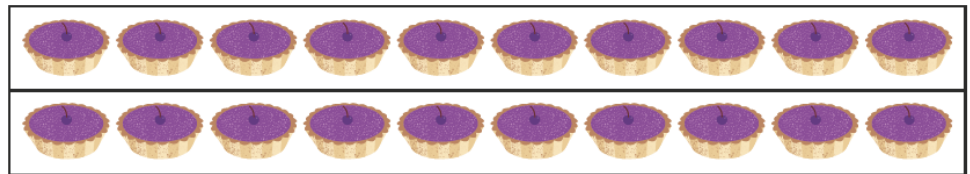
$2 \times 10 = 20$ ———— $20 \div 10 = \boxed{}$

$10 \times 2 = 20$ ———— $20 \div 2 = \boxed{}$

Ruby has 15 marshmallows.
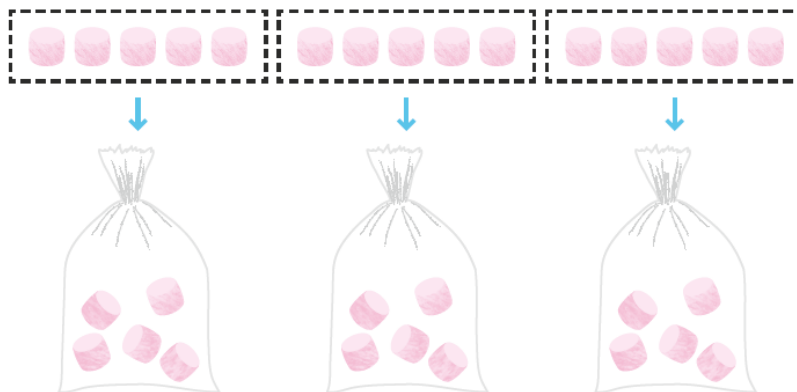She packs 5 marshmallows into each bag.
How many bags does Ruby need?

$\boxed{} \times 5 = 15$

Method 1 Use 🔴 to stand for 🍬 .

Use 🥤 for each bag.

Method 2 Draw a picture.

Method 3 Use a division equation.

$\boxed{} \div \boxed{} = \boxed{}$

Solving problems

Ruby needs $\boxed{}$ bags.