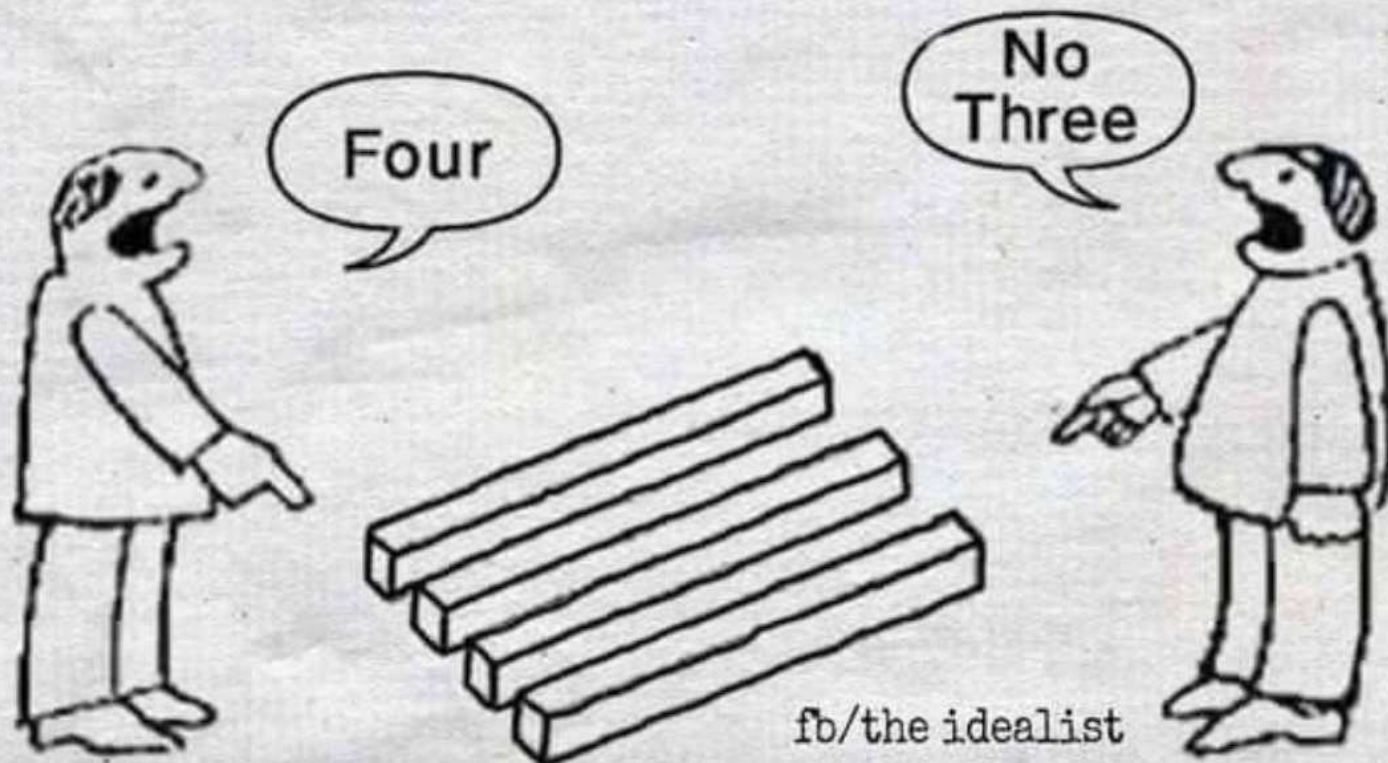


"Everything we hear
is an opinion, not a fact.
Everything we see
is a perspective, not the truth."

- Marcus Aurelius



fb/the idealist

MATHS 
NO PROBLEM!

Why Singapore Maths?

- Singapore developed a new way of teaching maths following their poor performance in international league tables in the early 1980's. The Singapore Ministry of Education decided to take the best practice research findings from the West and applied them to the classroom with transformational results.
- Based on recommendations from notable experts such as Jerome Bruner, Richard Skemp, Jean Piaget, Lev Vygotsky, and Zoltan Deines, Singapore maths is an amalgamation of global ideas delivered as a highly-effective programme of teaching methods and resources.
- Now Singapore is one of the top countries for mathematics.



Series Consultant
Dr Yeap Ban Har

- Dr Yeap Ban Har is one of the world's leading experts on the Singapore Method and is the technical consultant for the Maths - No Problem! series.
- An accomplished and inspirational trainer, Ban Har spent ten years at the National Institute of Education in Singapore where he was involved in several funded research programmes in mathematics education. Ban Har was part of the team which reviewed the Singapore Maths curriculum for the revised 2013 syllabus and he teaches courses at tertiary institutions in South East Asia and North America.

MATHS
NO PROBLEM! 

What is the maths thinking?



Instrumental understanding vs relational understanding
(rote and memorisation) (Exploration and Questioning)

- Problem solving needs to be at the 'heart' of the curriculum to ensure we help children to perform at a high level.
- Children need to build a strong understanding of the basics, also known as fluency, not speed!
- They also need to have productive habits of mind – what do the children believe maths to be e.g. do the children check and challenge themselves.

Concrete, Pictorial, Abstract Approach

Concrete

- Concrete is the “doing” stage, using concrete objects to model problems. Instead of the traditional method of maths teaching, where a teacher demonstrates how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical objects themselves. Every new abstract concept is learned first with a “concrete” or physical experience.
- For example, if a problem is about adding up four baskets of fruit, the children might first handle actual fruit before progressing to handling counters or cubes which are used to represent the fruit.

Concrete, Pictorial, Abstract Approach

Pictorial

Pictorial is the "seeing" stage, using representations of the objects to model problems. This stage encourages children to make a mental connection between the physical object and abstract levels of understanding by drawing or looking at pictures, circles, diagrams or models which represent the objects in the problem.

Building or drawing a model makes it easier for children to grasp concepts they traditionally find more difficult, such as fractions, as it helps them visualise the problem and make it more accessible.

Concrete, Pictorial, Abstract Approach

Abstract

Abstract is the "symbolic" stage, where children are able to use abstract symbols to model problems (Hauser).

Only once a child has demonstrated that they have a solid understanding of the "concrete" and "pictorial" representations of the problem they are taught the abstract symbols. Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols, for example $+$, $-$, \times , \div to indicate addition, multiplication, or division.

Although we've presented CPA as three distinct stages, a skilled teacher will go back and forth between each representation to reinforce concepts.

In the classroom the children use an array of different equipment. Likewise, children are encouraged to represent the day's maths problem in a variety of ways, for example, drawing an array, a number bond diagram or a bar model.

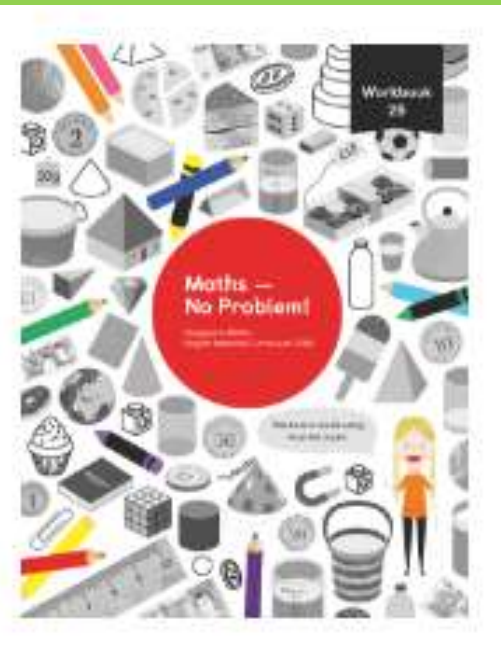
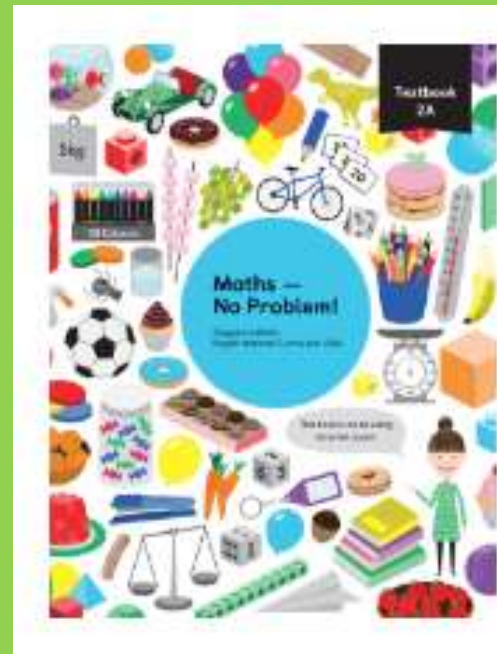
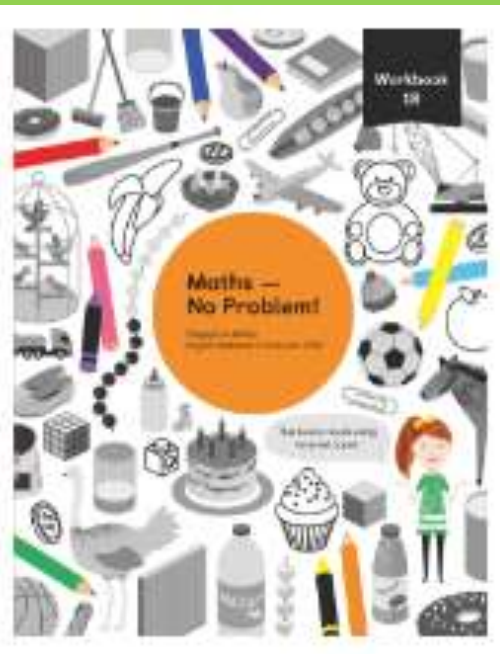
How it works in the classroom.

- Focus task at the start of the lesson
- Shared learning /Activities
- Guided Practice
- Independent work

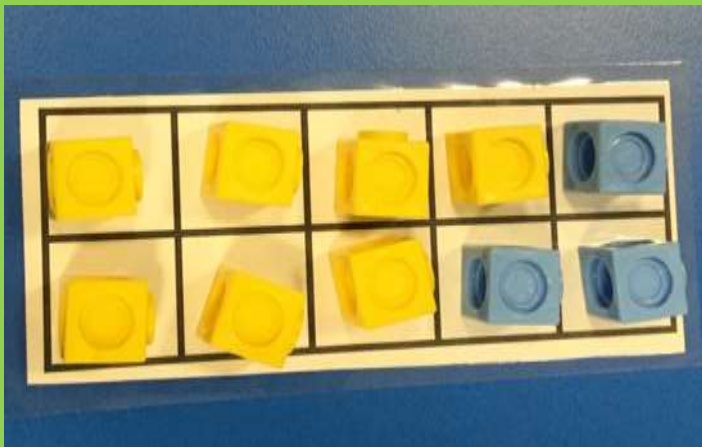
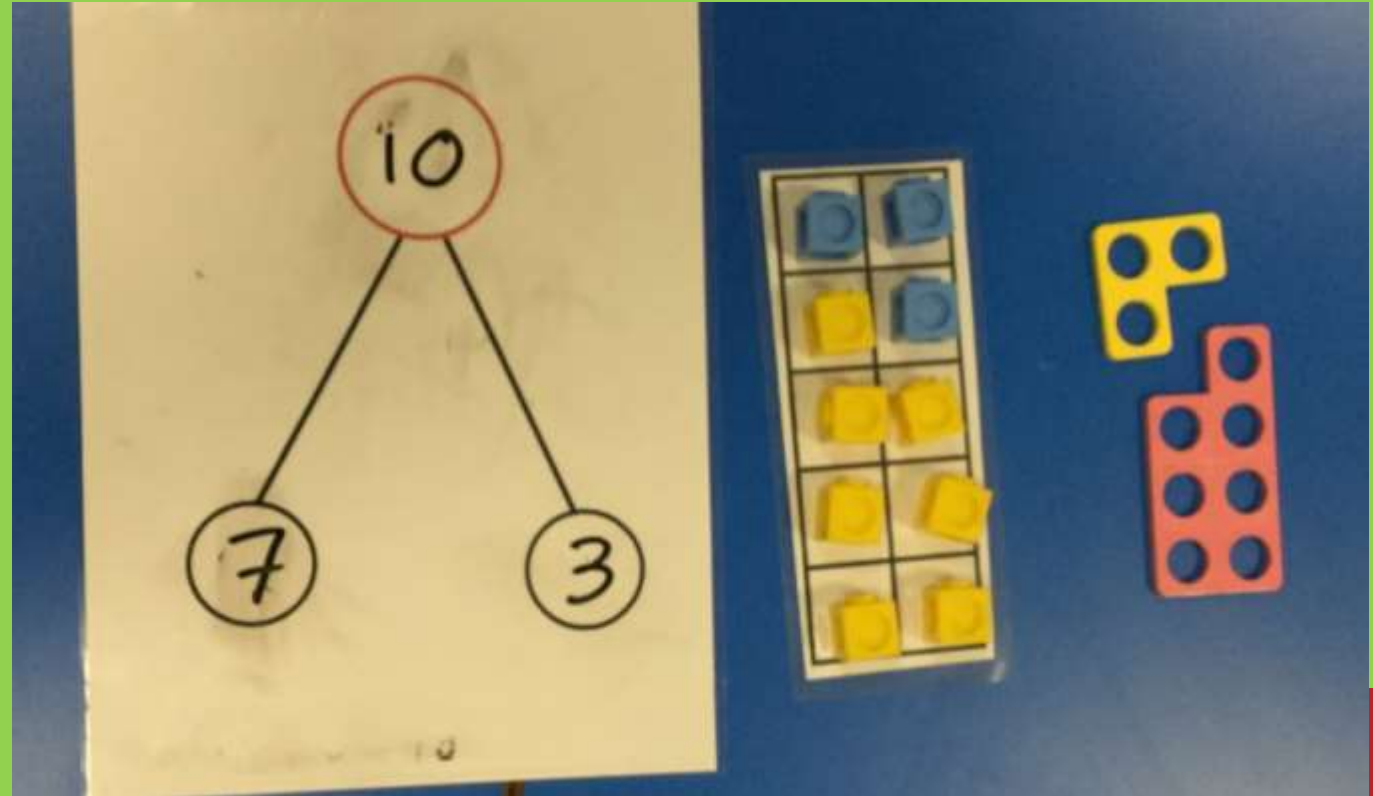
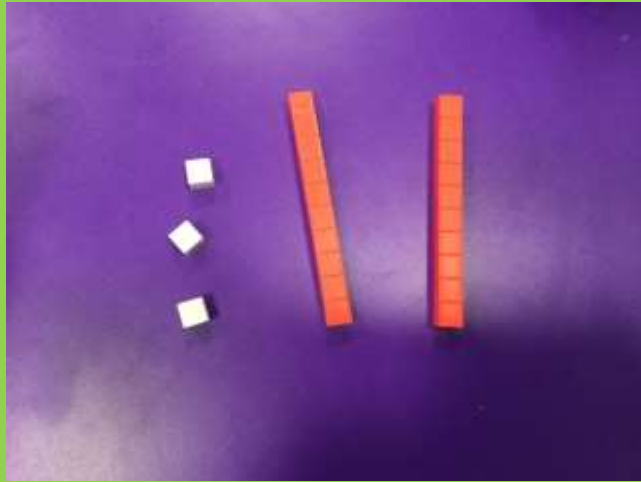
What do the children work in?

MATHS
NO PROBLEM! 

Children work through their maths workbooks
and in maths journals.

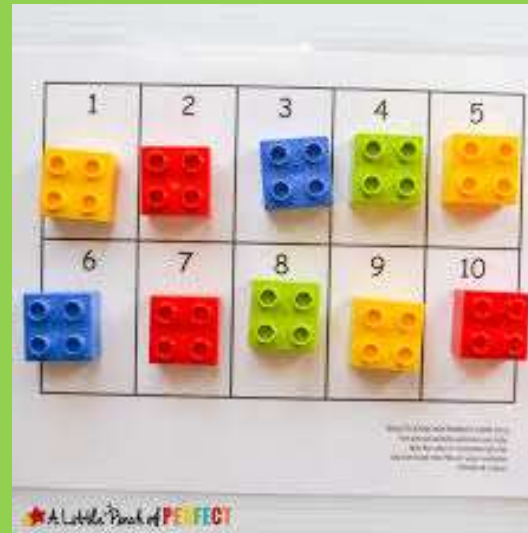
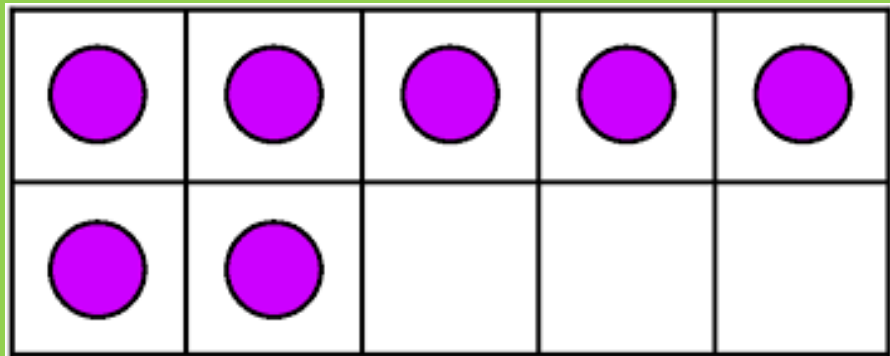


What equipment do the children use?



10 Frames

This helps the children to have a good understanding of numbers and learn basic number facts.





- <https://www.youtube.com/watch?v=AVjvswqL-Ow>

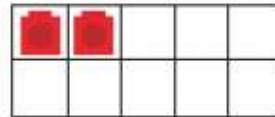
10 Frames

Count.

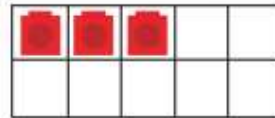
How many  are there?



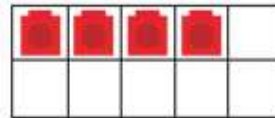
Show the numbers on  using .



2

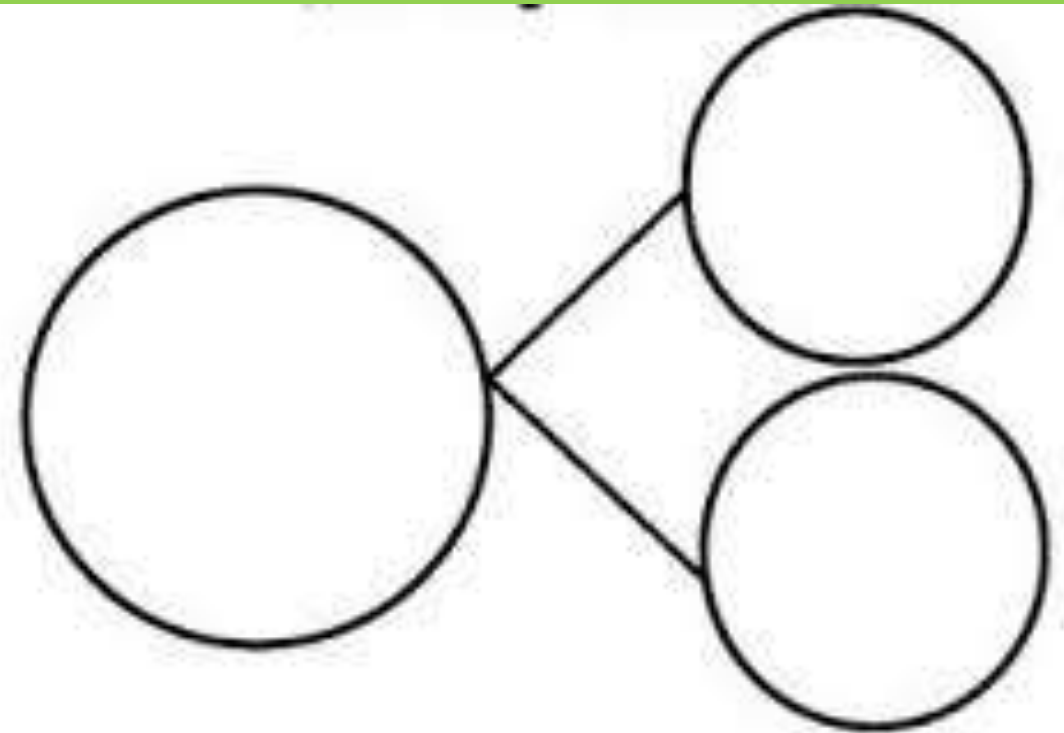
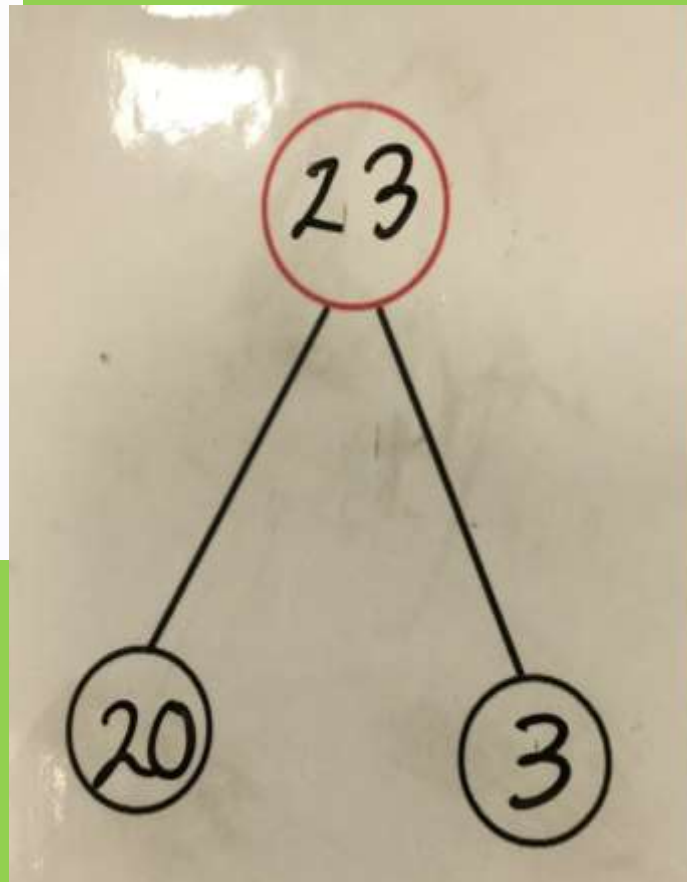
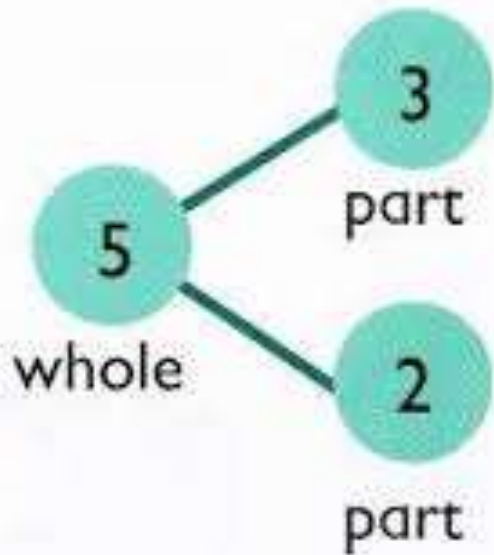


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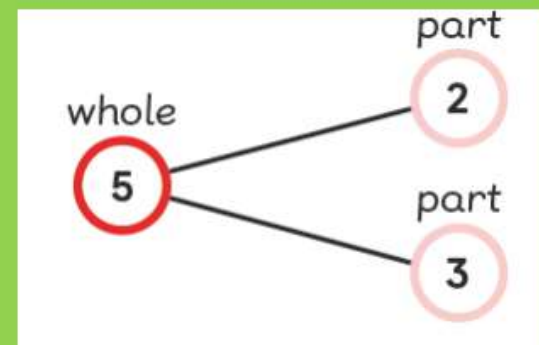
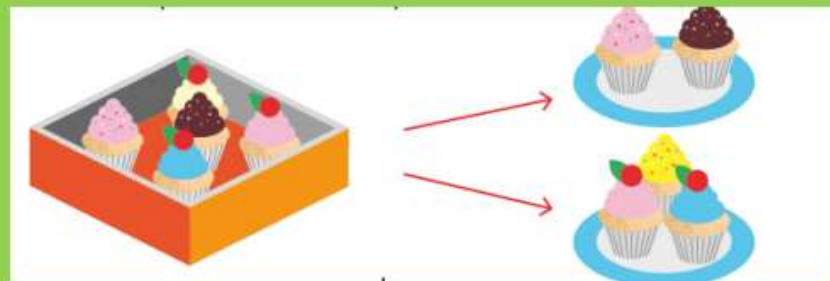
4

Part - Part - Whole Diagrams



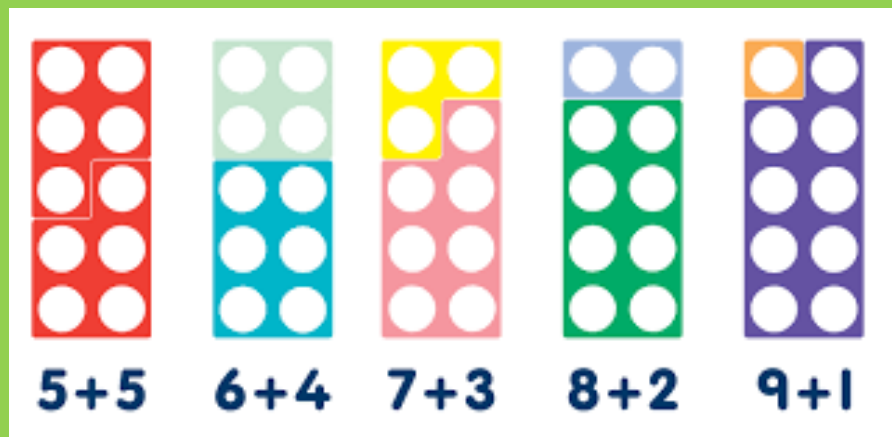
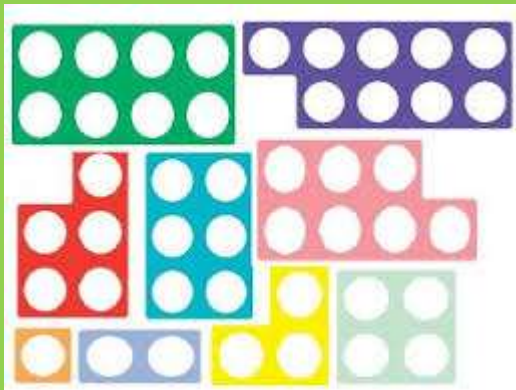
Part - Part - Whole Diagrams

Adding number bonds

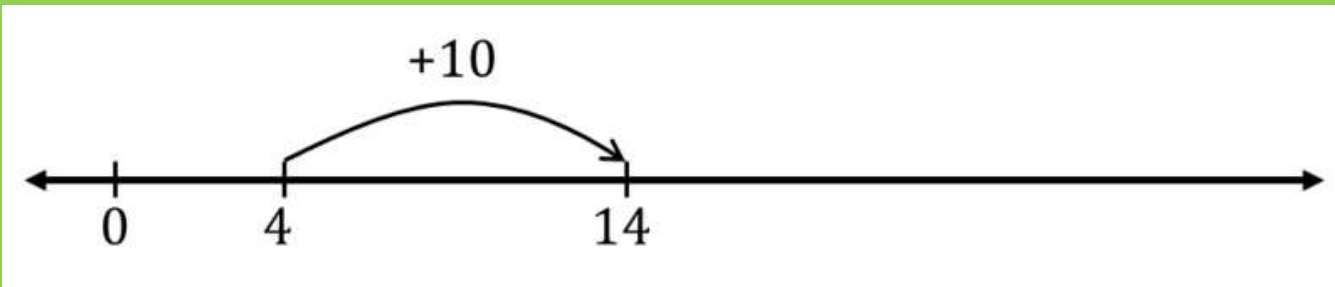
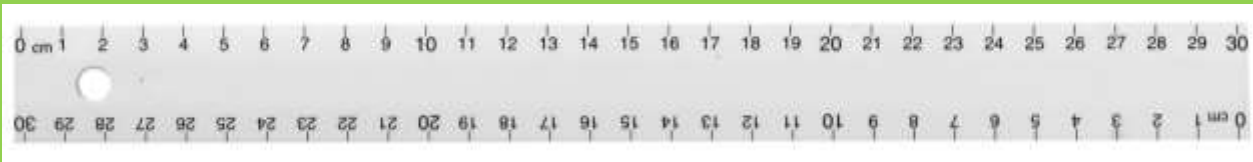
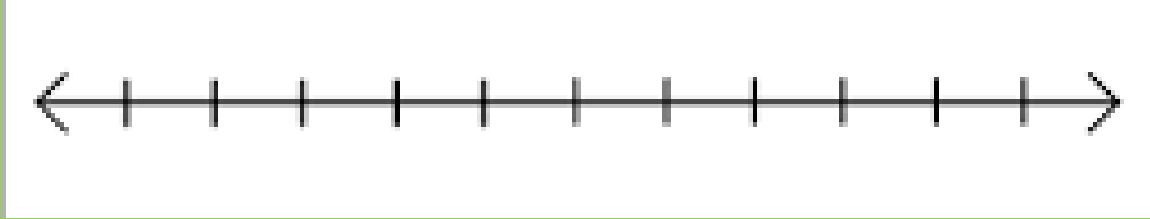


Numicon

Numicon's imagery uses patterns to represent each numeral. The patterns are structured so number relationships can be seen and experienced. It is used to understand number bonds and values. It is good for place value, adding, taking away, finding the difference. These can also be used to teach about fractions, decimals and percentages.



Number lines

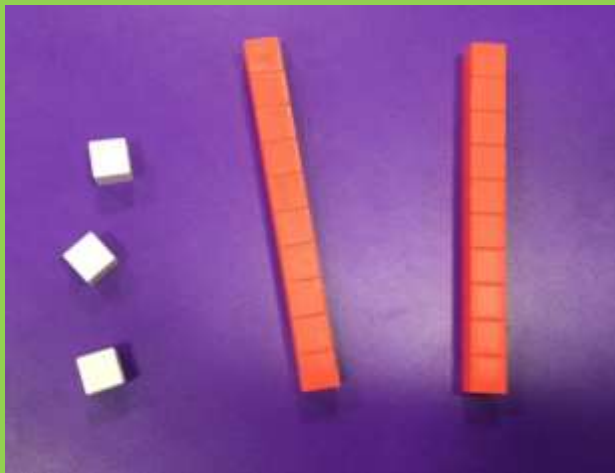


Blank number lines
Creating their own
or using existing
number lines. It is
fantastic for adding
and subtracting in
maths.

Dienes



Plastic blocks, in ones, rows of ten and larger arrays of 100 and 1000s. They are invaluable for helping children to develop an understanding of place value. They are also great for exploring the concept of regrouping in addition and subtraction



The blue ribbon is 31 cm long.
The blue ribbon is 12 cm longer than the red ribbon.
Can we draw models to find out how long the red ribbon is?

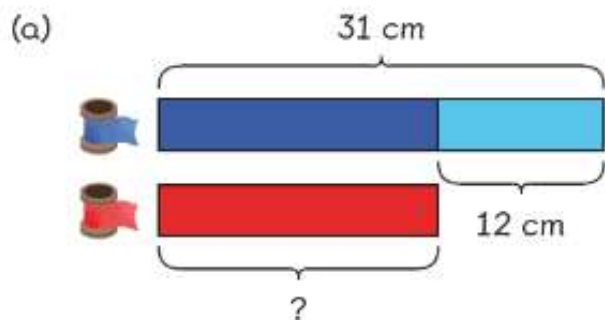
Let's Learn

1

 is 31 cm long.

 is 12 cm longer than .

- (a) How long is the red ribbon?
(b) What is the total length of the two pieces of ribbon?



$$31 - 12 = 19$$

The red ribbon is 19 cm long.

Bar Models

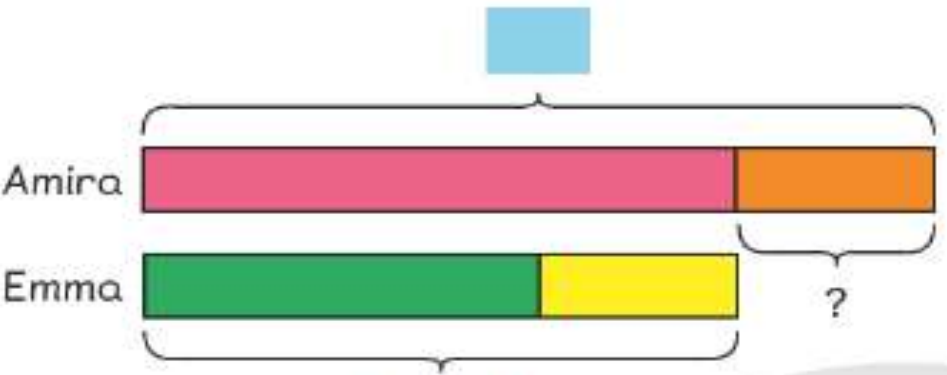
MATHS
NO PROBLEM! 


- Visual representation of a number using bars/ Used in pictorial approach to solving addition, subtraction, multiplication and division problems.

Bar Models - Have a go!

- 2 Emma had 42 stickers and Amira had 81 stickers. Then, Emma bought 20 more stickers.
- (a) How many stickers did Emma have after buying 20 more stickers?
 - (b) How many more stickers than Emma did Amira have after Emma bought more?

(b)



Amira had  more stickers than Emma had.

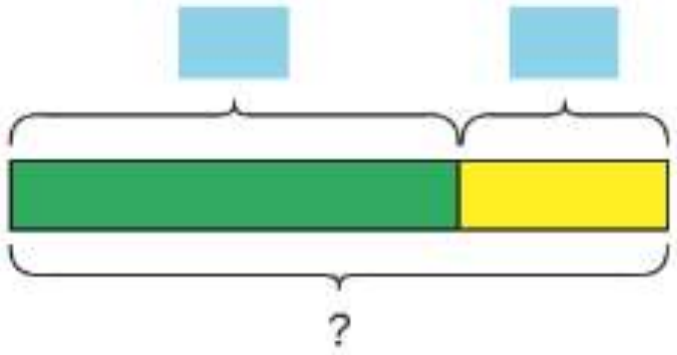
How do you know when to add or subtract?



Bar Models - Have a go!

- 2 Emma had 42 stickers and Amira had 81 stickers. Then, Emma bought 20 more stickers.
- (a) How many stickers did Emma have after buying 20 more stickers?
 - (b) How many more stickers than Emma did Amira have after Emma bought more?

(a)



Should we add or subtract?



   = 

Emma had  stickers.

Jottings

Children are now encouraged to show their working out. They can show this using pictures and/or jottings.

For example by drawing symbols and pictures we can understand what the children are doing and then check their working out.

Children are also encouraged to check their working out by doing the same question in a different way.

Finished work - Further challenges

Can you show me using...

- Physical Models e.g. cubes/dienes blocks etc.
- Visual Models – pictures and numbers.
- Explanations – child to write an explanation for another child/alien etc. and give some examples.
- Story – children to write a sensible story to match the problem
- Problem solving task e.g. reversing/missing numbers etc.

How can you help at home...

- Encourage the children to use some of the methods used in school.
- Encourage children to practical resources to work out answers - use pasta pieces, toys, cubes, Lego pieces etc to represent numbers.
- Encourage children to give it a go - can they explain how they got the answer.
- Play maths games - dominos, cards, number bingos.
- Try to encourage understanding rather than speed.

How can you help at home...

Give the children everyday experiences with maths

- Money - using money so they know the coins, count the money in their money boxes
- Weight - let them weigh out ingredients
- Time - look at the clock and tell the time
- Count items - any items around the house e.g how many books do they have? How many pairs of socks (counting in twos)
- Play maths games and activities Maths Tasks to Do At Home
 - <https://www.youcubed.org/tasks/>

Things to take home...

- Part-part-whole / Blank number line template
- Handout on how to help out at home -
Youcubed
- List of helpful games and websites to help out
at home

Questions?

Year 1 - Have a go!

In Focus



There are
8 flowers in the vase.
I am holding
2 flowers.

Should we add or subtract to find the total number of flowers?

Year 1 - Have a go!

Guided Practice

Holly has 7 foreign coins. She also has 9 local coins.

(a) How many coins does Holly have?



I try to use drawings.

I try to calculate.



(b) Of the 7 foreign coins, 3 are from Asia and the rest are from South America.





How many coins are from South America?



Year 1 - Have a go!

2

3 of the flowers are mine.



The rest are mine.



12

3 $?$

$12 - 3 = \square$

\square flowers are mine.