Appendix 2 - Singapore 'Bar Method' (YR-Y6) to help visualise problems and identify operations to use

Year R/1 – introducing and top tips

1. Count things with objects
Try counting familiar things together like the number of people in the room, kids' ages, or goals in football matches, using concrete objects like counters, buttons or small stones, lining them up one by one. If nothing's to hand use fingers.

2. Interlocking cubes
Try carrying round a few to count things when you're out and about. They are also good for kids to play with to keep them occupied.

3. Use cut-out pictures
Draw pictures on paper and cut them out to use as counters to count people, ages, goals, coins or fruit.

4. Do basic arithmetic with objects
Talk about most basic arithmetic using concrete objects, adding objects to the line, taking them away. 'Multiply' literally means 'many layers' and you can show times tables by layering rows one on top of the other.

5. Draw pictures
Children to draw things they count, lined up in a row. Encourage them to draw boxes around the pictures. The fact they have drawn the pictures gives them a sense of ownership and means they'll probably be more confident in talking about them.

6. Don't rush to use figures
Hold off from using number symbols until the children are really confident with concrete and pictorial representations and can make the link. So they will always have a ready way of picturing what the symbol means as a fall-back.

7. Start with figures 1 to 9
When you do start using symbols to label drawn boxes, stick to 1 to 9 at first to build confidence, so one figure relates to one quantity. The leap from the figure 9 to the figure 10 involves concepts of place value and zero which can take time to understand but this will be supported by Numicon

8. Go slowly to build confidence
It takes time for children to get really confident with the basics. The Singapore curriculum actually covers less than the UK national curriculum in the first few years, instead taking more time to build confidence in the basics. But this pays off in spades later on.

Year 1/2 – comparison (=)

The problem:
The Singapore method goes from handling "concrete" things, to drawing one-to-one "pictorial" iconic representations of them, to eventually understanding and using the mysterious "abstract" symbols with confidence.

**1. Lining up objects in a row**
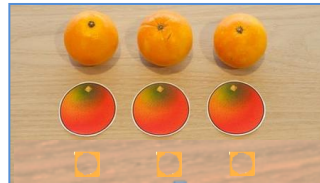
Children start by counting familiar things using blocks or cut-out pictures they can physically line up in a row. For instance counting pieces of fruit, their own ages, or people in the room. With one block , Numicon or cut-out picture for each orange, or year, or person.

They can learn most basic maths concepts with these objects. For instance add objects to the row, or take them away, to understand adding and subtraction. Or split a row in the middle to understand halving.
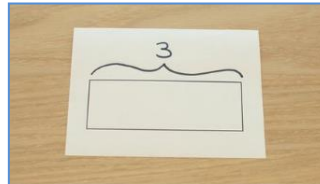
2. Drawing boxes around picture
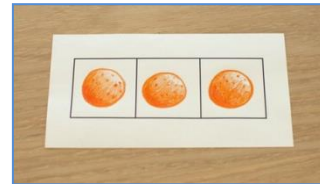
Then children start to draw pictures on paper of the things they are counting, with a box around each picture. So there's one box for each thing they are counting.

Over time they drop the pictures and just draw the boxes

**3. Labelling the boxes**

Gradually, once they are confident with drawing boxes to count objects, children start to write the number of boxes as a figure above the drawing. Eventually they no longer

need to draw all the boxes. They just draw one long box or bar and label it with the number. This step away from one-to-one representations to symbols is crucial and it may take a year or more for some children to become confident with it. But the benefits later on are worth it.
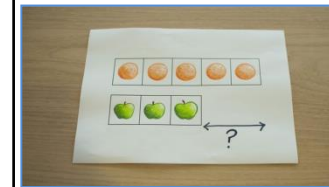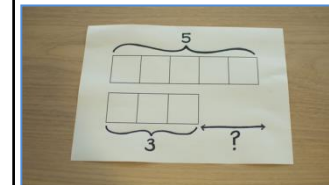
Year 3 - comparison (=)

The problem:
Imagine you have five oranges and three apples, how many more oranges than apples?
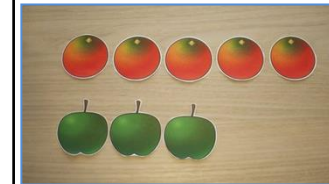
At first children model the problem with physical objects they can move around: like these cut-out pictures.

After a few months they start to draw pictures of the problem to help them think about it.
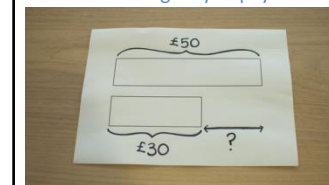

Over time children drop the pictures and just draw boxes. Then they start adding numbers as labels.
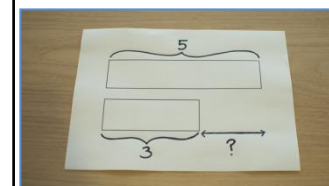
Once children are confident with the meaning of the number symbol they no longer need to draw all the boxes. However they know they can always draw the boxes in again if they need to convince themselves.

The problem:
How much change if you pay for a £30 shirt with a £50 note?

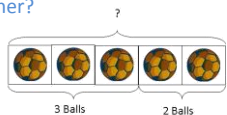The model can be used to help visualise almost any maths problem.

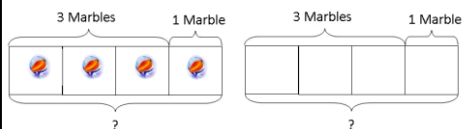# Appendix 2 – Examples of the Singapore 'Bar Method' solving problems

Addition

AGGREGATION - The problem:
There are 3 footballs in the red basket and 2 footballs in the blue basket. How many footballs are there together?
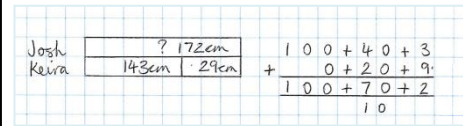

3 Balls   2 Balls

AUGMENTATION - The problem:
Peter has 3 marbles. Harry gives Peter 1 more marble. How many marbles does Peter have now?

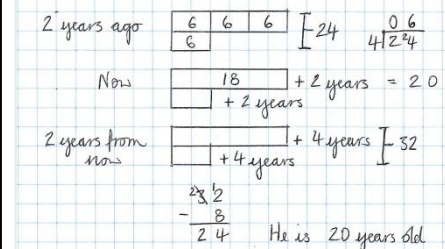Concrete → Abstract

The problem:
Keira is 143cm tall and Josh is 29cm taller than her. How tall is Josh?
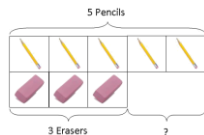

Algebra

Algebra problem
Two years ago, Mr Brown was 3 times as old as his sister. Two years from now, the sum of their ages will be 32 years. How old is Mr Brown now?
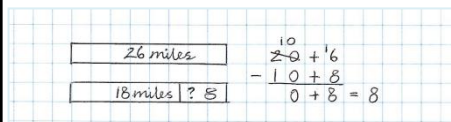

Subtraction

Comparison model - The problem:
Peter has 5 pencils and 3 erasers. How many more pencils than erasers does he have?


5 Pencils
3 Erasers

The problem:
Kelsey was running a 26 mile marathon, after 18 miles she felt very tired. How many more miles did she have to run?
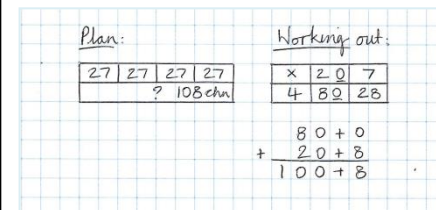

The problem:
Kim baked an equal number of brownies and cupcakes for a charity event. After 36 brownies were sold, 4 times as many cupcakes as brownies remained. How many desserts had Kim baked for the fundraiser?

Algebra

Algebra problem:
If $2a + 25 = 57$, what is a?
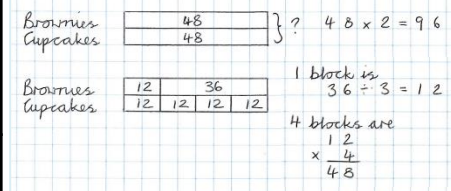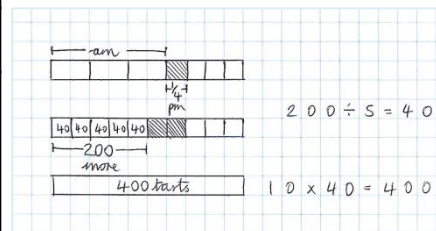

Multiplication

The problem:
In St Andrew's school, there are 4 classes with 27 children in each class. How many children go to St Andrew's school?
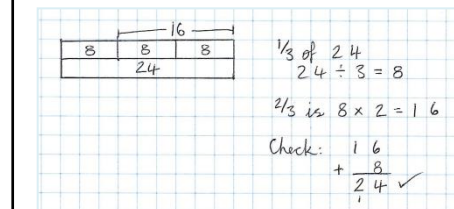

Division/ Multiplication

The problem:
Mrs. Chen made some tarts. She sold 3/5 of them in the morning and ¼ of the remainder on the afternoon. If she sold 200 more tarts in the morning than in the afternoon, how many tarts did she make?
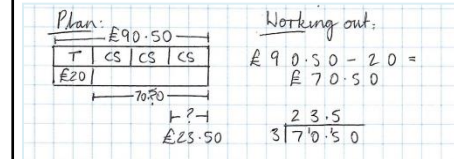

Division

The problem:
Kelly buys 24 flowers. 2/3 of them are white. How many white flowers are there?
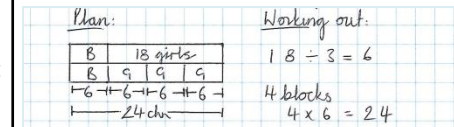

The problem:
Frank goes to a pet shop and buys a tarantula for £20 and 3 corn snakes. He spends £90.50 in total. How much does one corn snake cost?

The problem:
In a class, 18 of the children are girls. A quarter of the children in the class are boys? Altogether, how many of the children are there in the class?

Division/ Fractions

The problem:
In a bowl of 95 pebbles, 4/5 fifths of them are black. The rest are white. How many of the pebbles are black and how many are white?