

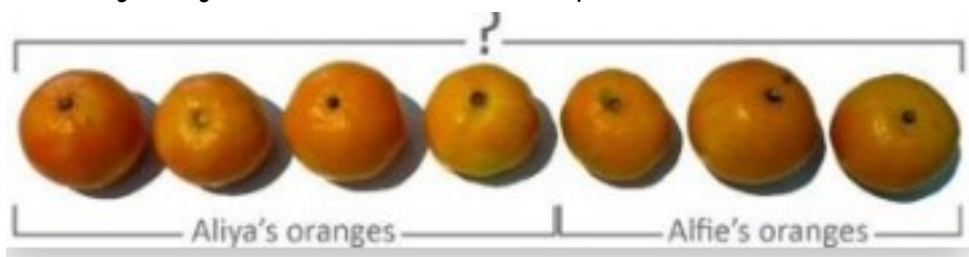
## Roe Farm Bar modelling

In maths a bar model is a pictorial representation of a problem or concept where bars or boxes are used to represent the known and unknown quantities. Bar models are most often used to solve number problems with the four operations - addition and subtraction, multiplication and division.

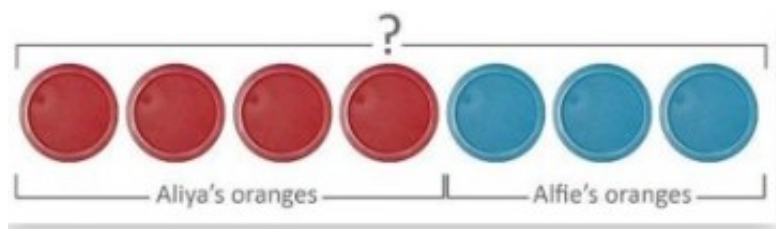
### How we use it at Roe Farm

#### KSI- Addition

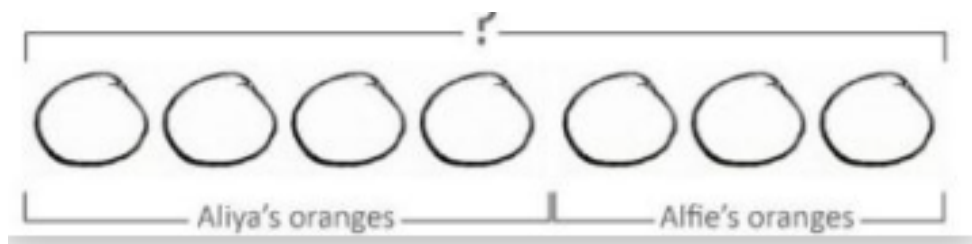
Pupils in Reception and Year 1 will routinely come across calculations such as  $4+3$ . Often, these calculations will be presented as word problems: Aliya has 4 oranges. Alfie has 3 oranges. How many oranges are there altogether? With addition, subtraction and multiplication, to help children fully understand later stages of bar modelling, it is crucial they begin with concrete representations.



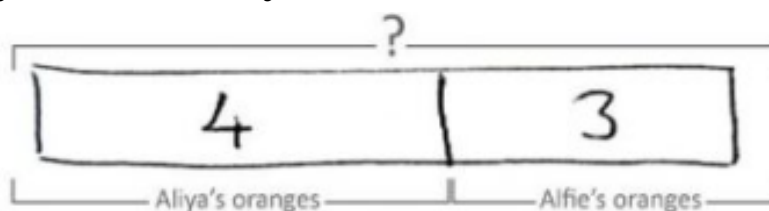
Once they are used to the format and able to represent word problems with models in this way themselves (assigning 'labels' verbally), the next stage is to replace the 'real' objects with objects that represent what is being discussed (in this case, we replace the 'real' oranges with button counters or even cubes):



A general rule of thumb would be that towards the end of Year 1 or start of Year 2, pupils should be able to understand and represent simple addition (and subtraction) word problems pictorially and assign written labels in a bar model.



The final stage stops the 1:1 representation. Each quantity is represented approximately as a rectangular bar:

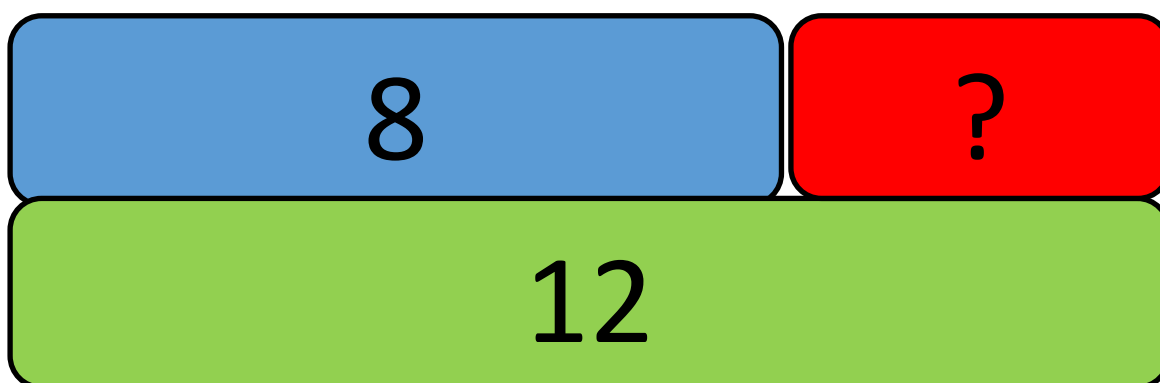


$$\text{Part} + \text{Part} = \text{Whole}$$

### Subtraction

The same concrete to pictorial stages can be applied to subtraction.

$$12 - 8 =$$



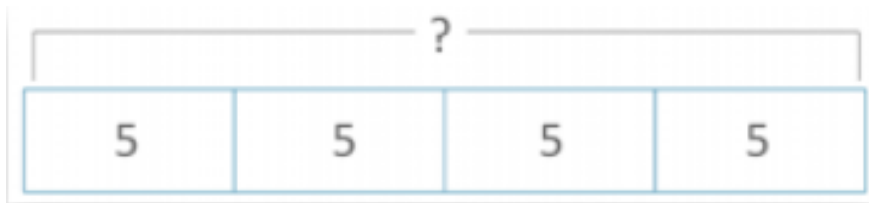
This should help with subtracting as it gives the children a clear representation that two parts make a whole. The children have to find the difference between these two numbers.

$$\text{Part} = \text{Whole} - \text{part}$$

## Multiplication

Bar models of multiplication start with the same 'real' and 'representative counters' stages as addition and subtraction. Then moves to its final stage, drawing rectangular bars to represent each group:

Each box contains 5 cookies. Lionel buys 4 boxes. How many cookies does Lionel have?



## Division

In division problems we know the whole but we don't know either the number of parts or what each part is worth.

