How maths is taught at Holy Family - Key Stage 1

We aim for pupils to develop a mastery of maths by allowing them to develop a long, deep and secure understanding of mathematical concepts.

To develop a deep understanding of calculation, children need to understand the structure of calculation, not just the procedure.

A secure understanding of each calculation allows pupils to develop secure mental methods.

This means they move on once they've mastered a concept.

Place Value

In order for pupils to be proficient in calculation, they need to have a secure understanding of place value - the position of each digit in a number.

Y1 - to 20
Y2 - to 100
Y3 - to 1000
Y4 - to 10,000
Y5 - tenths and hundredths
Y6 - to 10,000,000

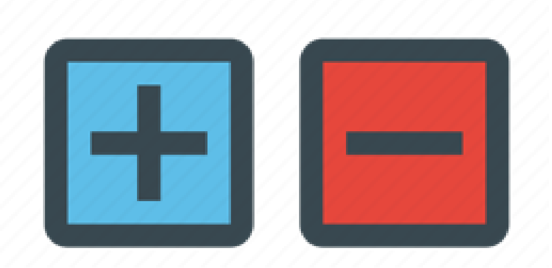
Skills taught at each year group.

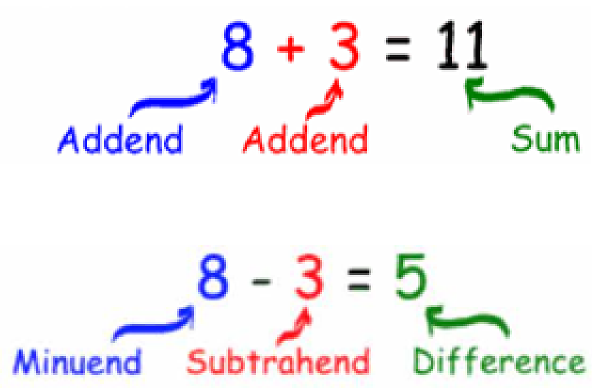
- Recognising the value of each digit
- Composing and decomposing numbers
- Locating and placing numbers on a number line
- Comparing and ordering numbers
- Finding the next multiple
- Rounding (KS2)

All this supports a deep and conceptual understanding of number in order to aid calculation.

Additive Relationship

(Addition and Subtraction)





Over two years, pupils will be taught to understand the additive relationship.
This is the concept that addition and subtraction are inverses of each other and relate to each other.

It is important the pupils understand the different structures of addition and subtraction.
These are:

Additive structures	
Aggregation	Y1
Partitioning	Y1
Augmentation	Y1
Reduction	Y1
Difference	Y2

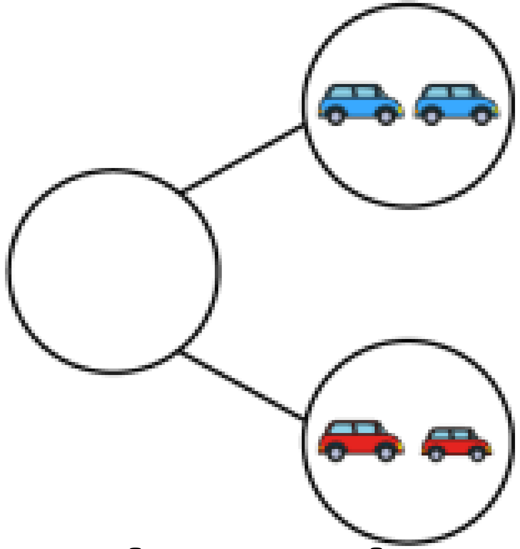
Additive structures

Aggregation Y1

Two or more parts make a whole.

Pupils will be expected to use language prompts given to them, like the ones in these slides.

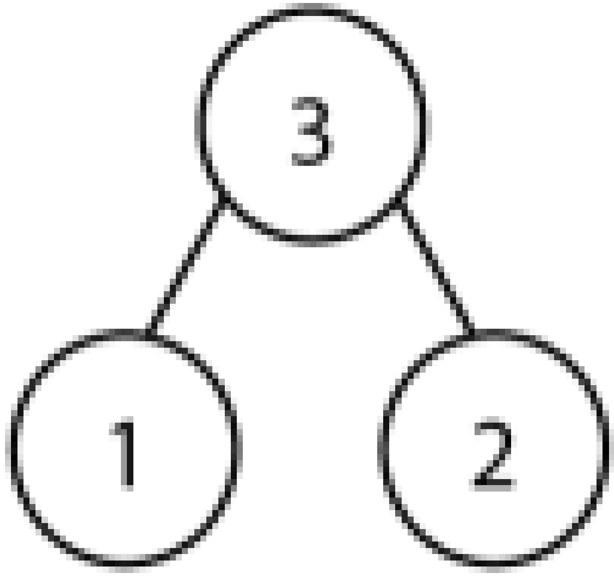
There are 2 blue cars and 2 red cars.
There are 4 cars altogether.



2 and 2 make 4
2 and 1 make 3

Part-part-whole model

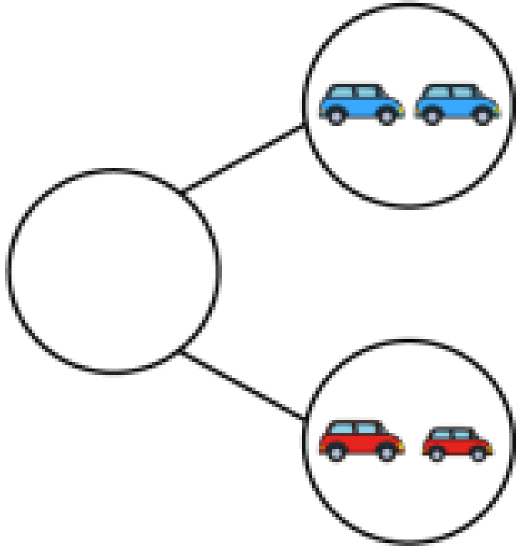
Pupils will use different representations/ manipulatives to help them understand and 'see' the maths. This is the first model introduced.



1 is a part, 2 is a part, 3 is the whole.

There are 4 cars altogether. 2 of them are blue, and 2 of them are red.

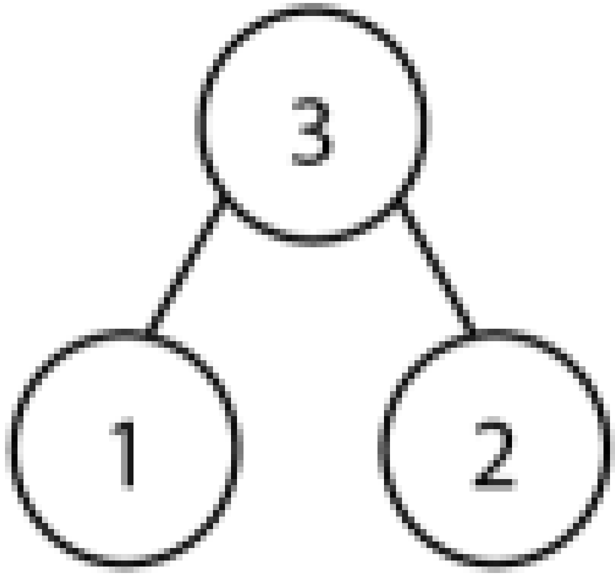
Additive structures	Introduced in
<u>Partitioning</u> A whole can be partitioned into two or more parts.	Y1



4 is made of 2 and 2

3 is made of 1 and 2

<u>Part-part-whole model</u>



I can partition 3 into 2 and 1.

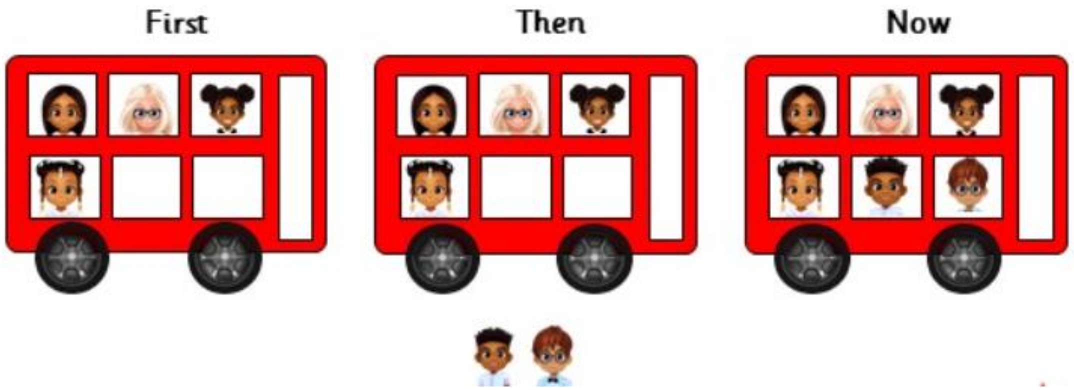
Additive structures

Introduced in

Augmentation Y1

Now there is one part, which is *changed* (added to)

First there were 4 people on the bus.
Then, 2 people got on.
Now, there are 6 people on the bus.

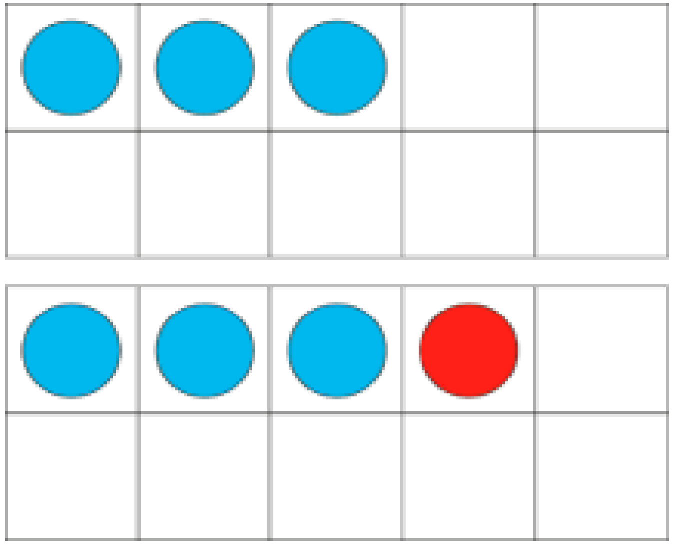


The 'first, now, then' story is how pupils are first introduced to this structure.

Pupils will begin to make connections between the <u>story</u> (bus), the <u>structure</u> (using counters) and the <u>numbers</u> (4+2=6). They need to know which number represents what.

Tens frames

*'**First**, James wrote three sentences.*
***Then**, he wrote one more sentence.*
***Now**, he has four sentences written down.'*

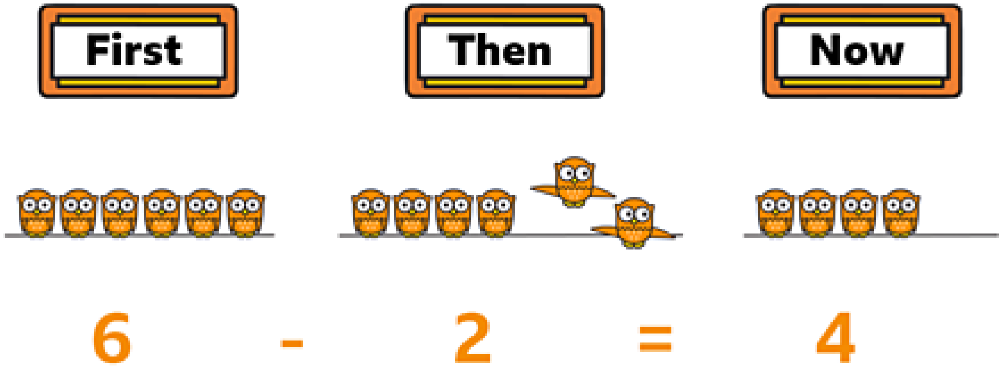


Additive structures Introduced in

<u>Reduction</u> Y1

Same as aggregation, but now the number is reduced.

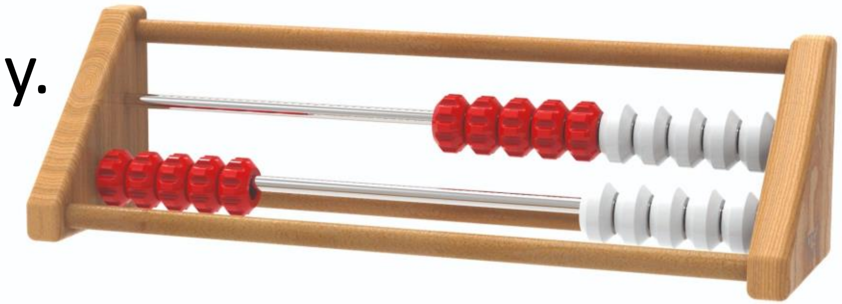
First there were 6 birds.
Then 2 flew away.
Now there are 4 birds left.



Rekenreks are a new resource which all KS1 and Reception pupils will use. They act like abacuses.

First there were 10 sweets,
Then Alex gave 5 sweets away.
Now he has 5 sweets.

<u>Rekenrek</u>



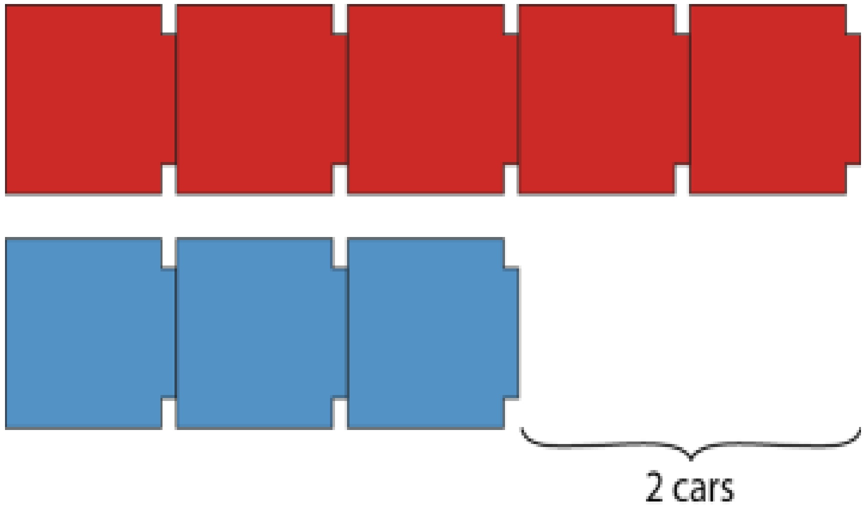
Additive structures

Introduced in

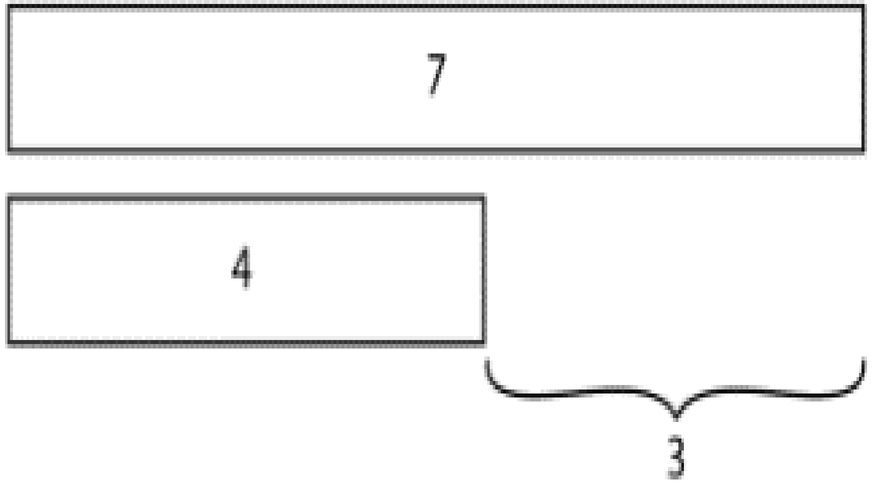
Difference Y2

A more challenging structure. We have 2 values and need to find the difference between them.

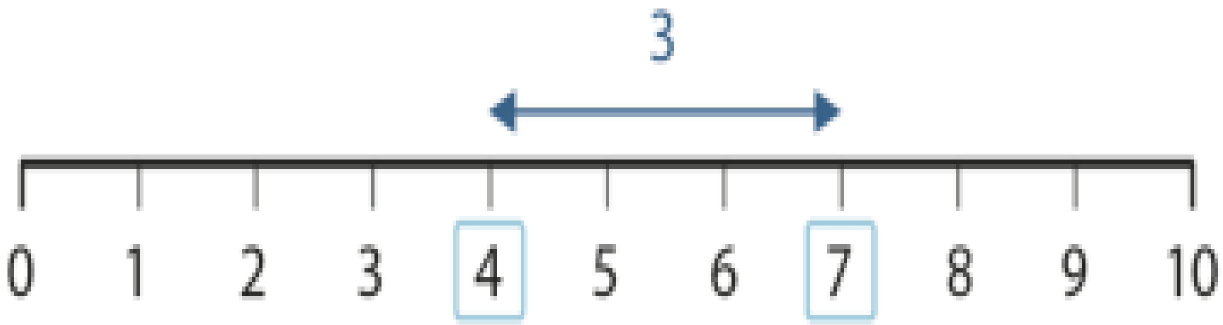
Comparative Bar Model



Alex saw 5 red cars and 3 blue cars on his trip. How many more red cars are there than blue cars?



Number line



Mastering Number

All pupils in Reception and KS1 take part in the Mastering Number scheme. This helps pupils to 'master' all number facts within 20.

One factor of poor attainment in KS2 is counting with fingers. All pupils in KS1 should leave knowing every number fact within 20, to help with calculation in KS2.
The facts within the 'stairs' are facts learnt at Y2. Facts in yellow are number bonds to 10.

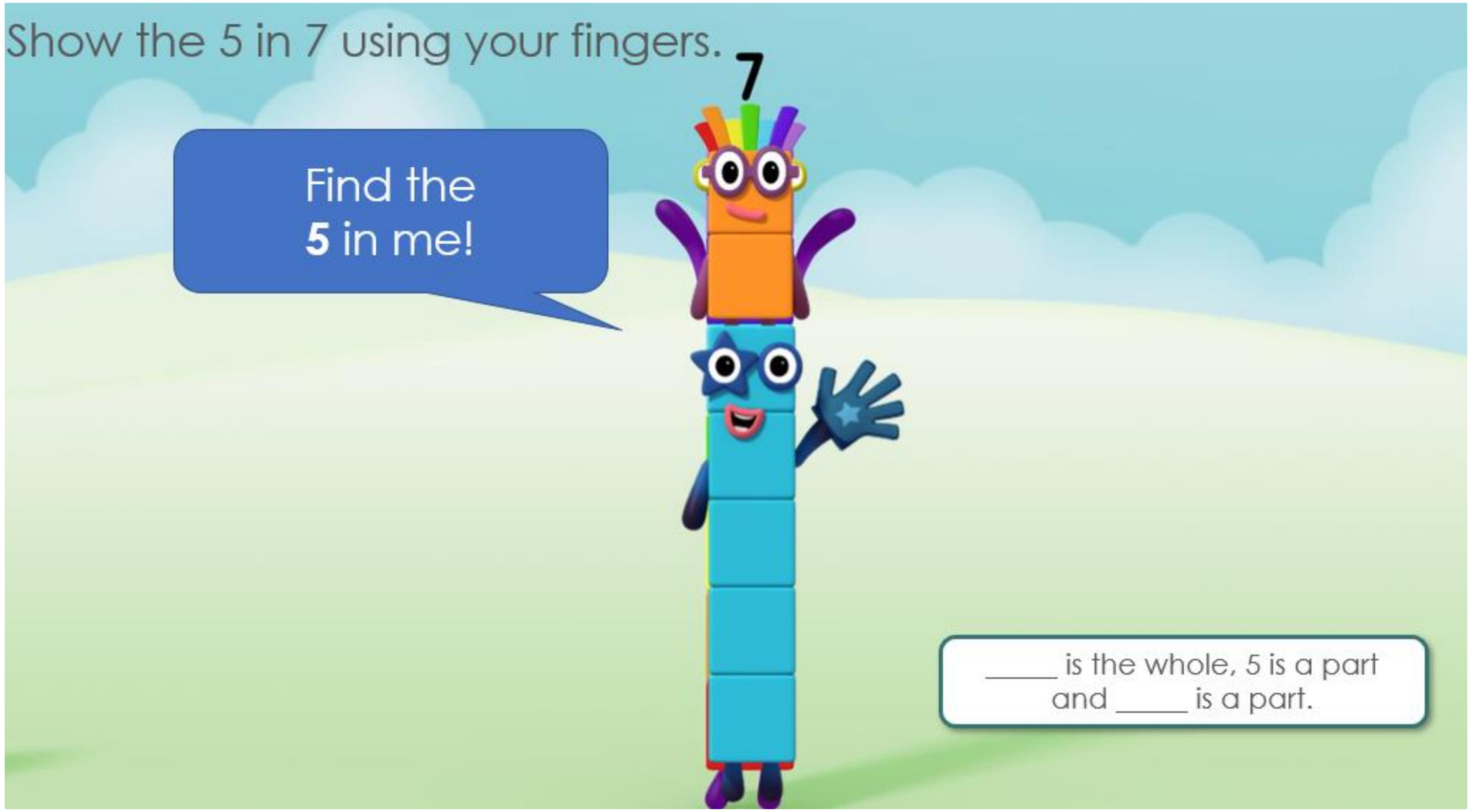
+	0	1	2	3	4	5	6	7	8	9	10
0	0 + 0	0 + 1	0 + 2	0 + 3	0 + 4	0 + 5	0 + 6	0 + 7	0 + 8	0 + 9	0 + 10
1	1 + 0	1 + 1	1 + 2	1 + 3	1 + 4	1 + 5	1 + 6	1 + 7	1 + 8	1 + 9	1 + 10
2	2 + 0	2 + 1	2 + 2	2 + 3	2 + 4	2 + 5	2 + 6	2 + 7	2 + 8	2 + 9	2 + 10
3	3 + 0	3 + 1	3 + 2	3 + 3	3 + 4	3 + 5	3 + 6	3 + 7	3 + 8	3 + 9	3 + 10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

Mastering Number

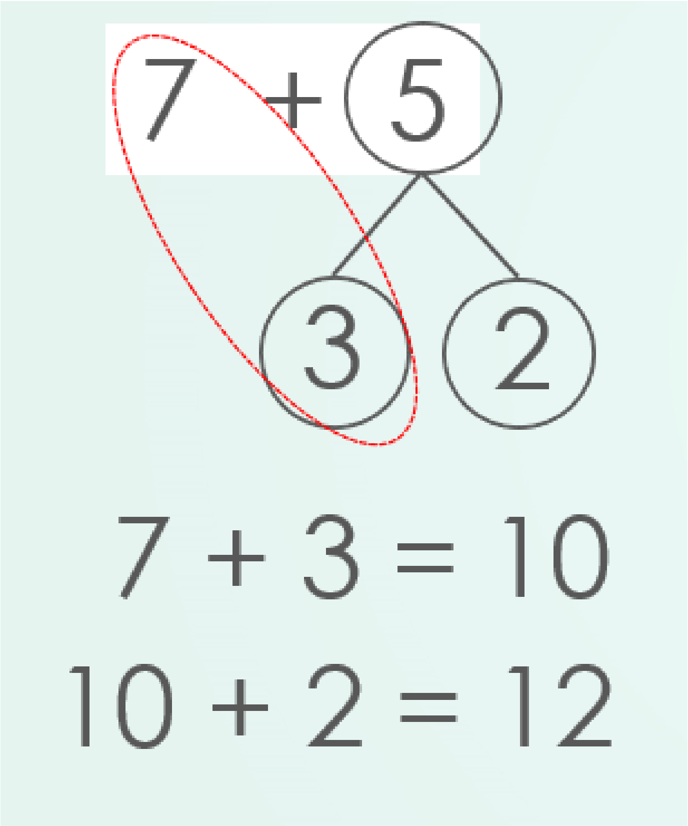
A common resource used is Numberblocks.
This helps pupils to see the composition of numbers to 10.

In Mastering Number, a lot of repetition of facts is used, as in the example above the picture.

7 is made of 5 and 2
5 and 2 make 7



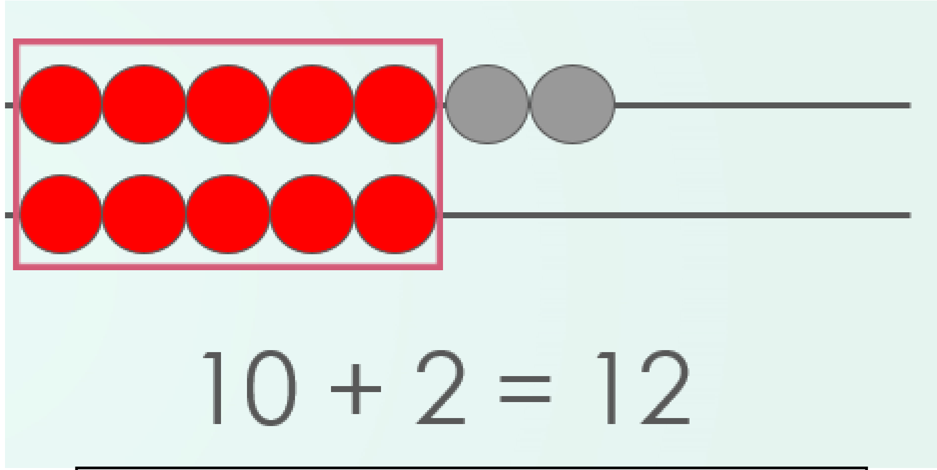
7 + 5



Partitioning the 5 into 3 and 2, because we know 7 and 3 make 10, then its 2 more.

Mastering Number

Strategies to solving calculations efficiently are taught.



Partitioning the 7 into 5 and 2, because 5 and 5 make 10, and its 2 more.

An over-reliance on counting strategies is associated with low attainment in mathematics and restrains flexible thinking.

Why is 7 + 5 so important to know automatically?

12 - 5

70 + 50

7 + 5 = 12

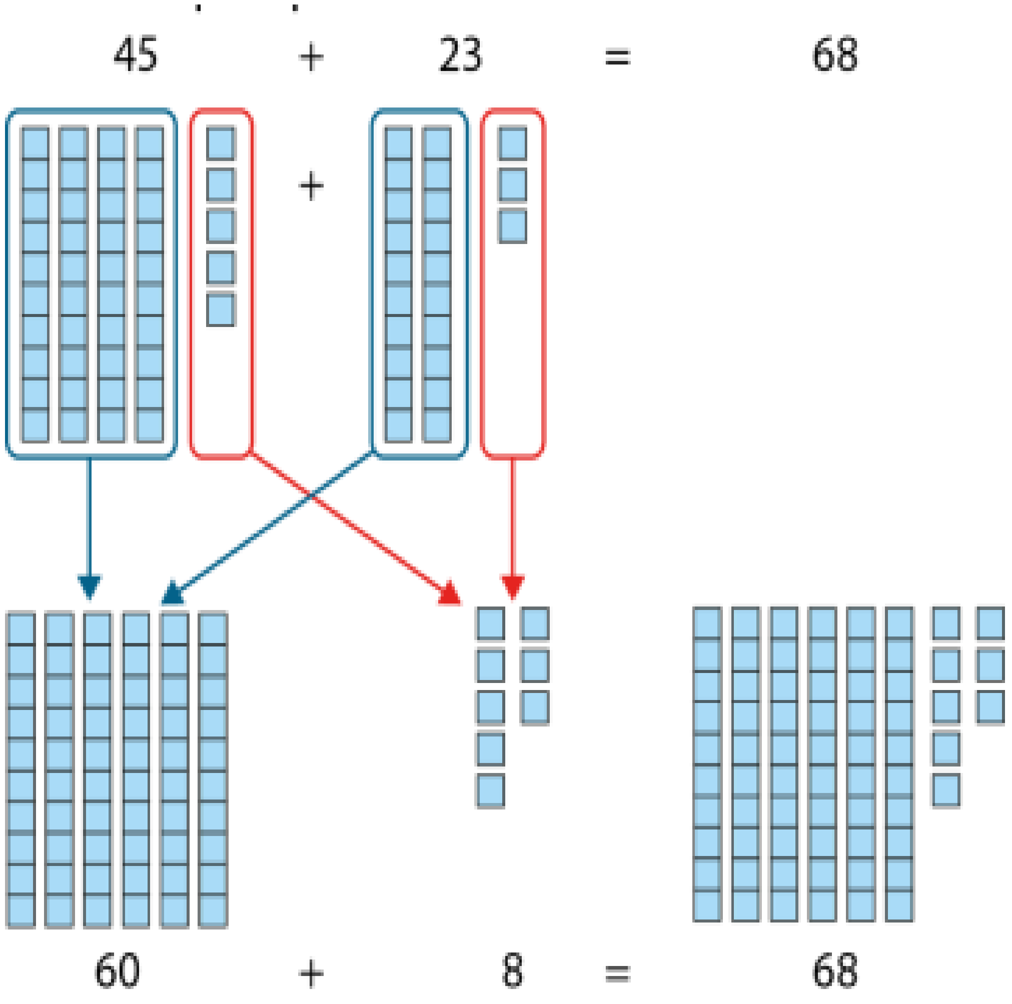
0.7 + 0.5

470
+350

Knowing this fact to automaticity means later calculations in KS2 become much easier to understand.

Moving towards written methods…

Dienes

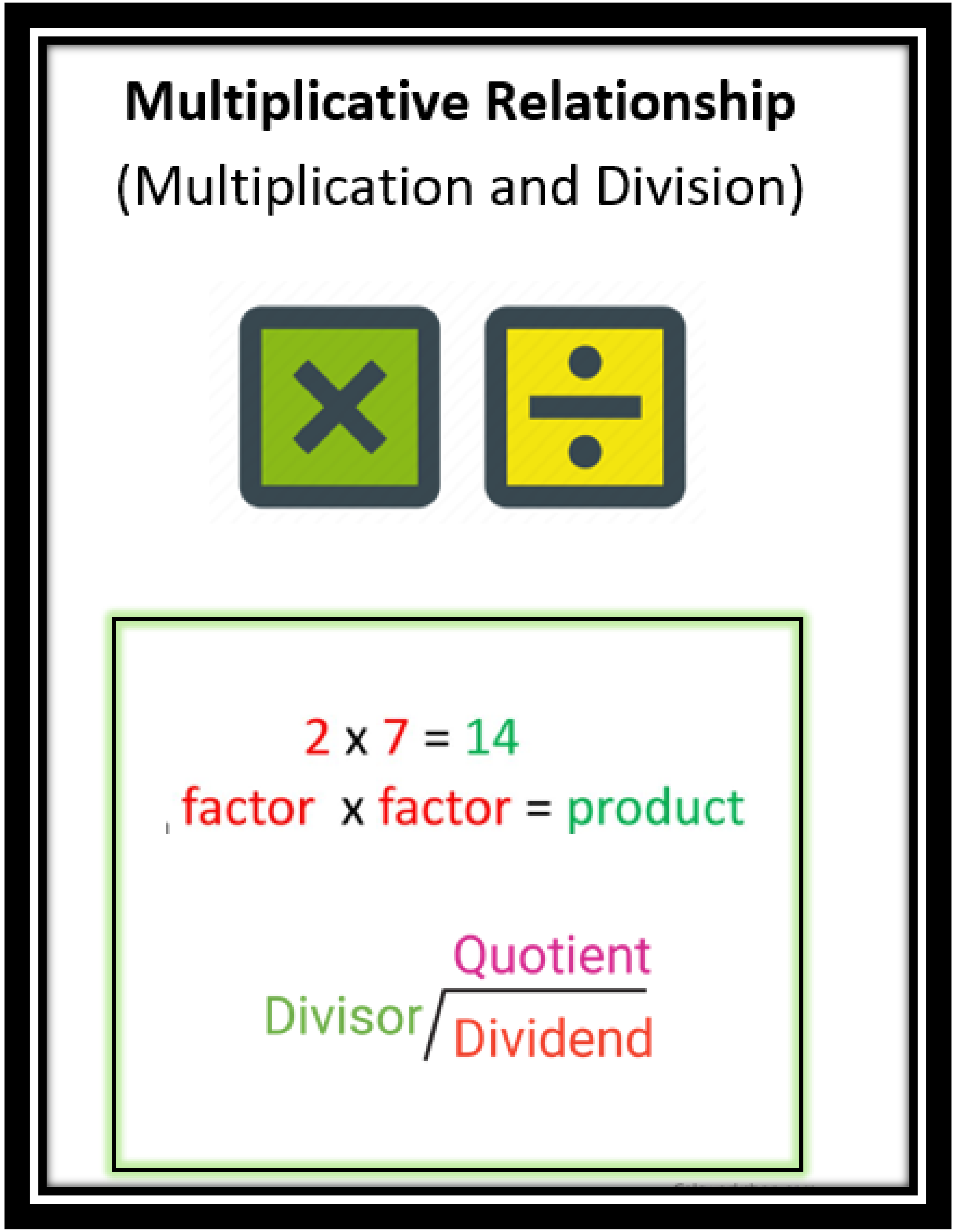


Into KS2…

- Applying mental strategies (both mental and written) to larger numbers.
- Columnar addition and subtraction
- Unpicking the structures learnt in KS1 into different problems, including fractions.

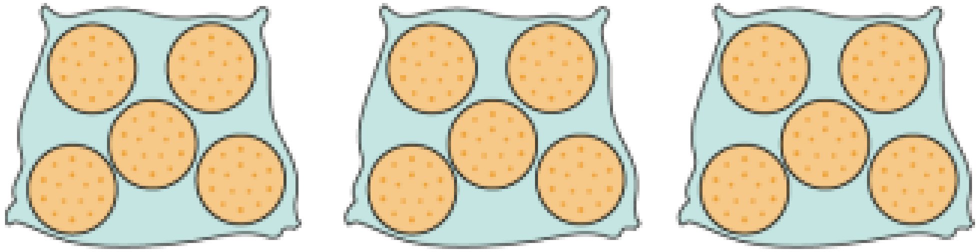
The multiplicative relationship works the same as the additive. Multiplication is the inverse of diversion and vice versa.

This relationship is not looked at in much detail compared to the additive.
There are a few key concepts that pupils will learn in Y2…



Unitising

Unitising is the idea that something can hold a value.
E.g. 1 bag = 5 cookies.

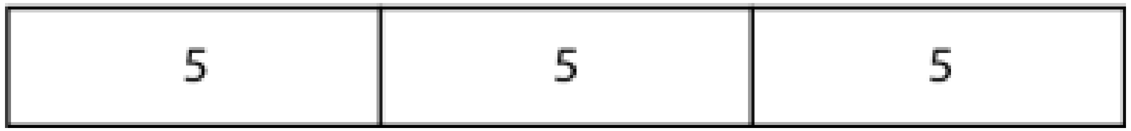


There are 3 bags of 5 cookies.
There are 15 cookies altogether.

5 + 5 + 5
5 x 3

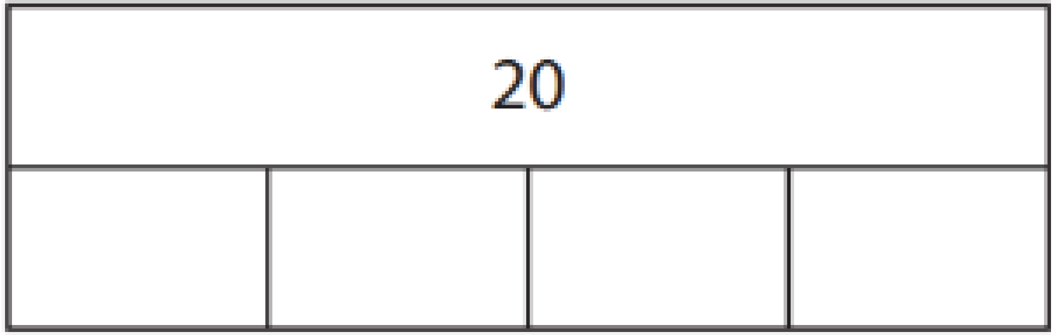
Pupils make the connection between repeated addition and multiplication.
5 'lots of'/'groups of' 3

Bar Model



$20 \div 4 =$ ______

Division is explored briefly as being able to skip count (e.g. 5, 10, 15, 20)

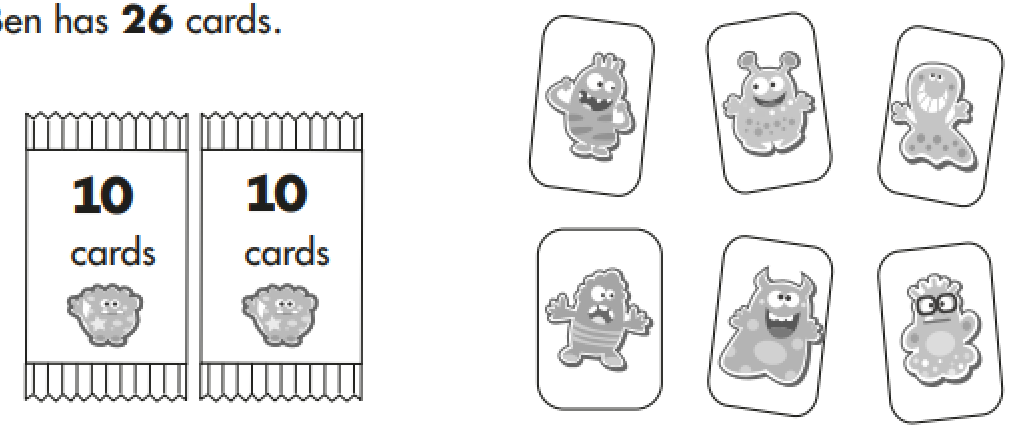


KS1 SATs problems show examples of learning.

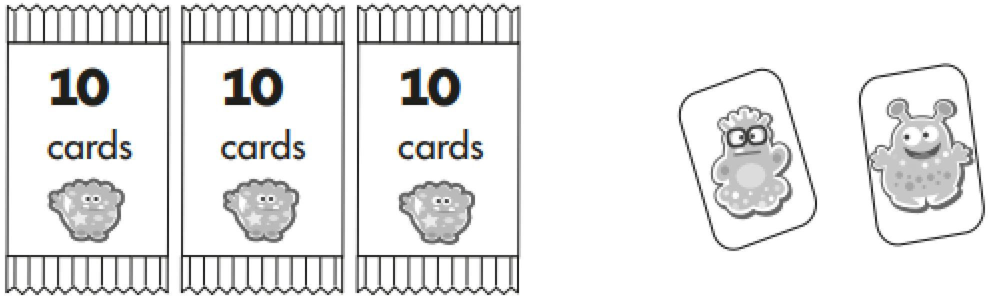
Unpicking structures in a problem

Aggregation

Ben has **26** cards.



Sita has **32** cards.



How many cards do Ben and Sita have **altogether**?

Difference

This is Ben's money.

This is Sita's money.

How much **more** money does Ben have than Sita?

KS1 SATs problems show examples of learning.

Understanding the additive relationship

Sita solved this calculation.

$$16 - 4 = 12$$

Circle **all** of the calculations that show how Sita could check her answer.

$16 + 4$

$4 + 12$

$4 + 16$

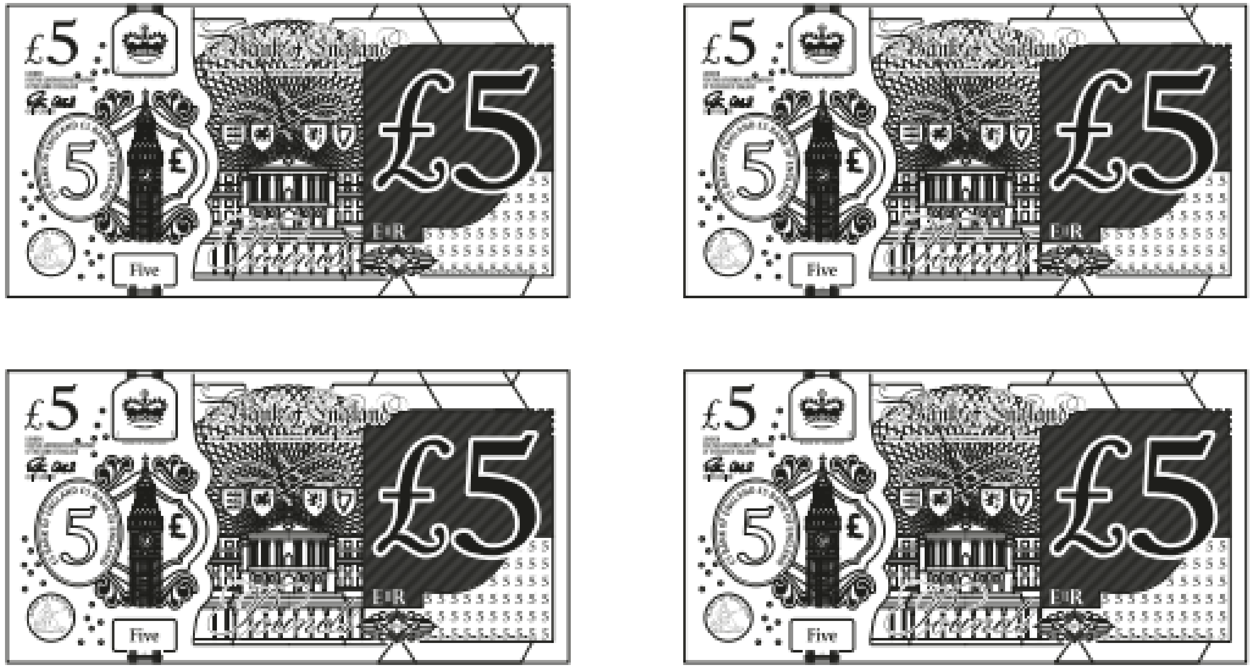
$12 + 4$

Unitising

KS1 SATs problems show examples of learning.

Sam buys a book for **£17**

He pays with **four £5** notes.



How can I help at home?

Prioritise number facts:

- Number bonds to 10 and 20,
- Doubles and halves

Avoid jumping ahead and teaching 'quick tricks' or methods – this makes flexible thinking difficult for them, and less likely to make connections.

Link in the real world with mathematics

e.g. 2 magpies just left, how many are there now?