

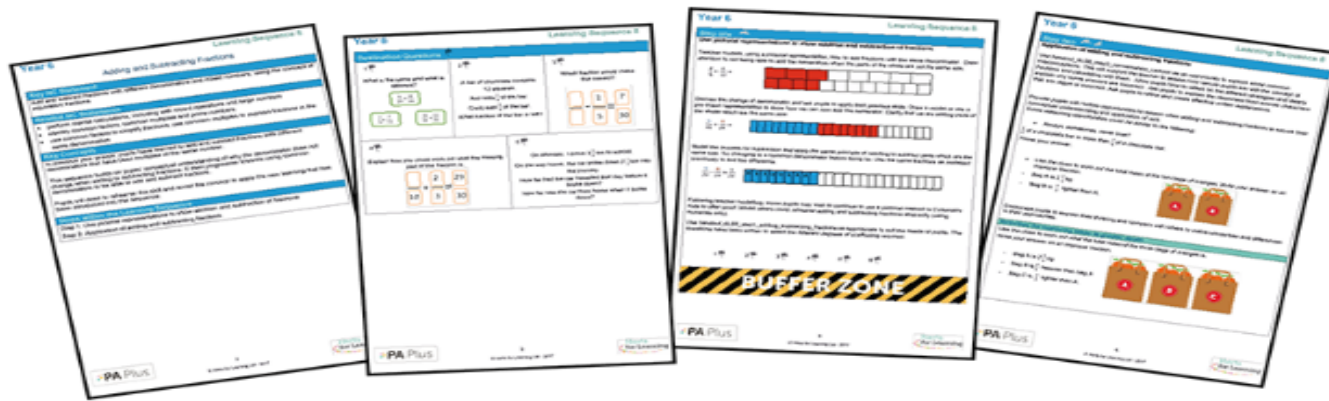
How is maths taught in EYFS and KS1?

Wednesday 3rd May 2023

Mr Douglas-Rose
Miss Buckley

What is Herts Essentials and why do we use it?

Our maths subject experts have designed an easy to pick up and use set of sequences with step by step guidance covering the entire mathematics curriculum from Year 1 to Year 6. Designed to support teachers, the planning includes examples of how concrete and pictorial representations can benefit pupils' learning as well as other mastery techniques. The **ESSENTIAL** maths planning tool has a wealth of ideas to deepen and extend mathematical thinking for all learners.



The **ESSENTIAL** maths sequences have been designed to benefit schools, teachers and pupils delivering carefully planned progression that ensures consistency. The inbuilt examples of what children should be able to achieve through destination questions allows teachers to keep assessing and informing the children's learning against age-related expectations. In addition, the fun and easily adaptable games, activities and resources are built in, saving time for teachers enabling them to reinvest their valuable time and focus on the needs of their pupils.

What is Concrete, Pictorial and Abstract?

Concrete manipulatives: Concrete manipulatives are objects that can be touched and moved by pupils to introduce, explore or reinforce a mathematical concept. They provide a vehicle to help pupils make sense of complex, symbolic and abstract ideas through exploration and manipulation. Furthermore, they support the development of internal models and help build stronger memory pathways.

Pictorial (including jottings): The act of translating the concrete experience into a pictorial representation helps focus attention on what has happened and why. This supports deeper understanding and a stronger imprint on memory. Pictorial representations are more malleable than concrete resources and, once understanding is secured, allow exploration of complex problems that may be challenging to reproduce with manipulatives.

Abstract – Written: The aim, within this policy, is for compacted forms of notation. These have developed through the history of mathematics. Explicit individual steps in procedure are hidden or they have been shortcut. The informal and expanded methods expose all the intermediate steps, replicating thought processes more closely and support understanding prior to compaction.

Abstract - Spoken Learning: to use the correct mathematical vocabulary is vital for the development of mathematical proficiency. The ability to articulate accurately allows pupils to communicate and build meaning. Ideas become more permanent. This can be scaffolded effectively using speaking frames.

End of year maths targets in EYFS

Mathematics

ELG: Number

Children at the expected level of development will:

- Have a deep understanding of number to 10, including the composition of each number;

13

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- Subitise (recognise quantities without counting) up to 5;
 - Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

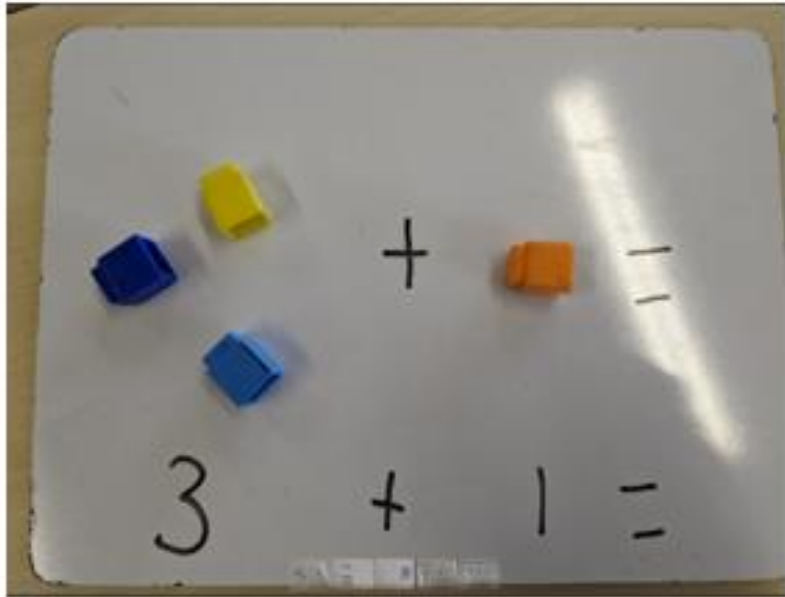
End of year maths targets in EYFS

ELG: Numerical Patterns

Children at the expected level of development will:

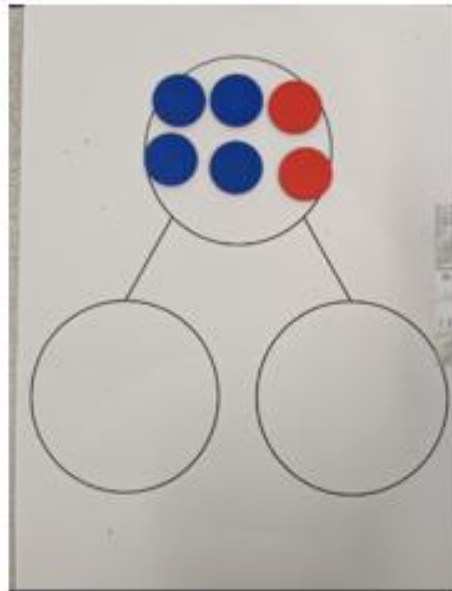
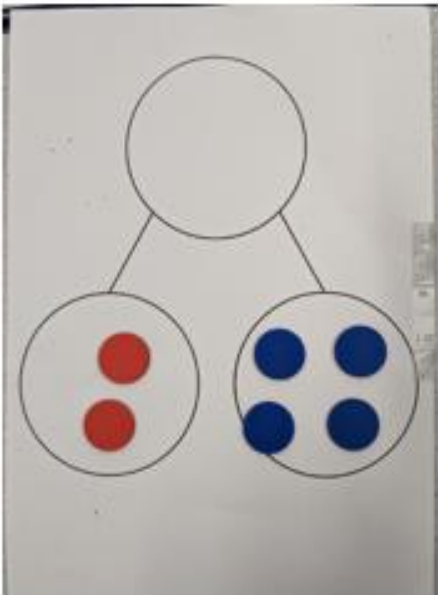
- Verbally count beyond 20, recognising the pattern of the counting system;
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Addition in EYFS



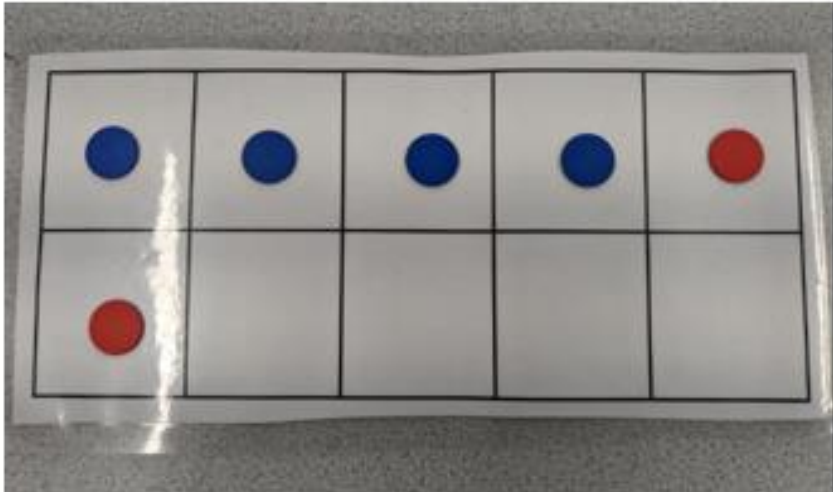
The children are shown cubes and will discuss the value of one cube. They will then use the cubes to build the number sentence. The numerals are then written underneath to develop understanding.

Addition in EYFS



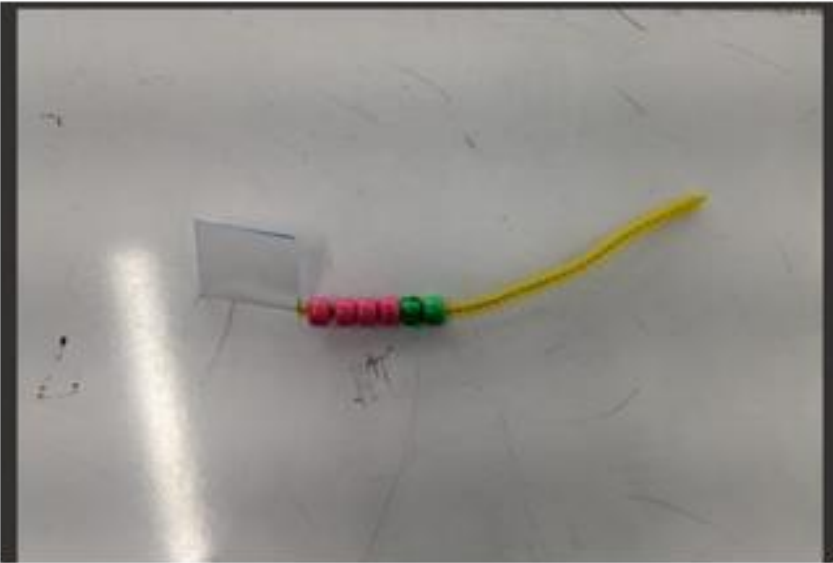
The children are shown a **part-part whole model** and will lay counters in each part. This example shows $4+2=6$. The children will then move the counters to demonstrate that the whole number answer is 6.

Addition in EYFS



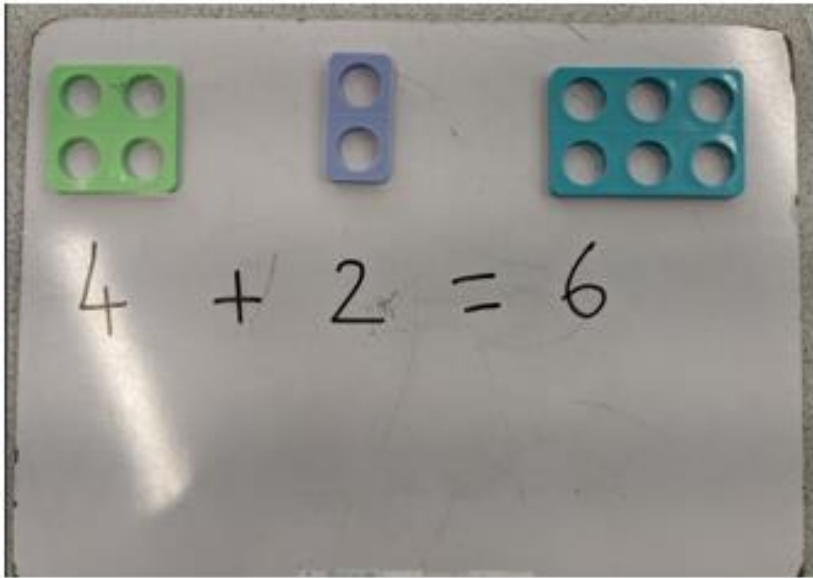
The children are shown a **tens frame** and will lay counters out using the different colours. This example shows $4+2=6$. The children will then count the counters to demonstrate that the whole number answer is 6.

Addition in EYFS



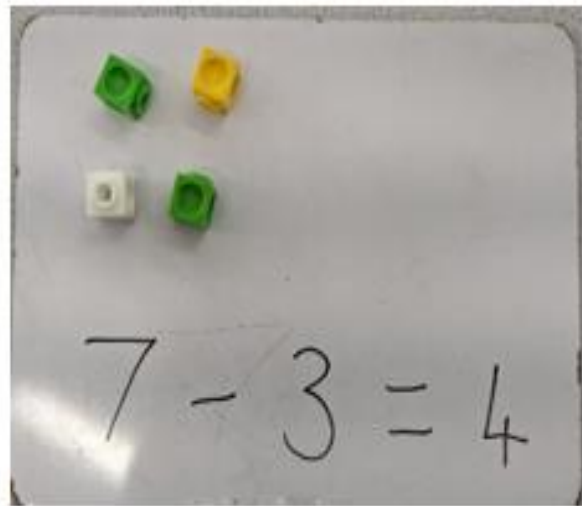
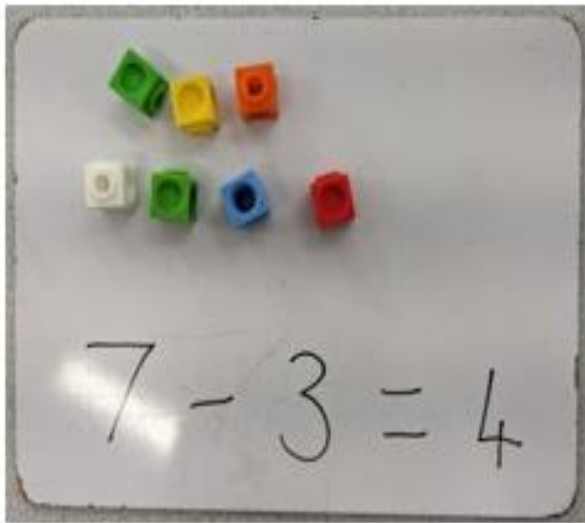
The children are shown a pipe cleaner and add beads on to represent the number sentence. This example shows $4+2=6$.

Addition in EYFS



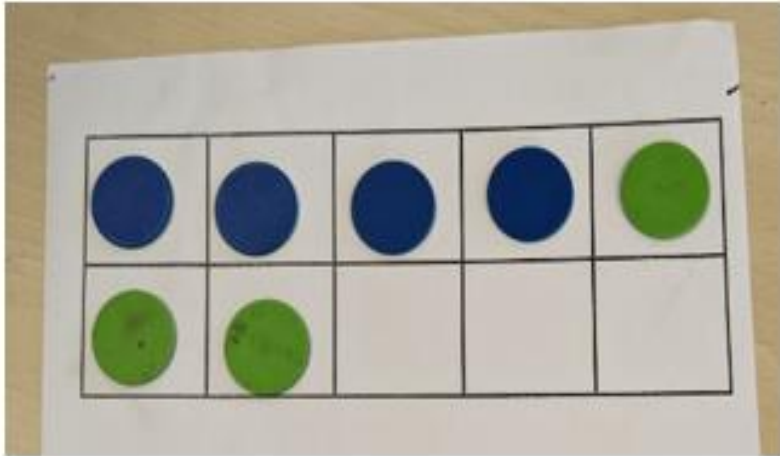
The children are shown numicon to represent number sentences. This example shows $4+2=6$. The numicon can also be put side by side to show the size of the 4 and 2 is the same as the 6.

Subtraction in EYFS



The children are shown cubes and will discuss the value of one cube. They will then lay out the amount of cubes they have and will physically take away what they need to. This leaves them with the answer.

Subtraction in EYFS



The children are shown a **tens frame** and will lay counters of the whole number. This example shows $7 - 3 = 4$. The children will turnover or physically take away the counters they need to.

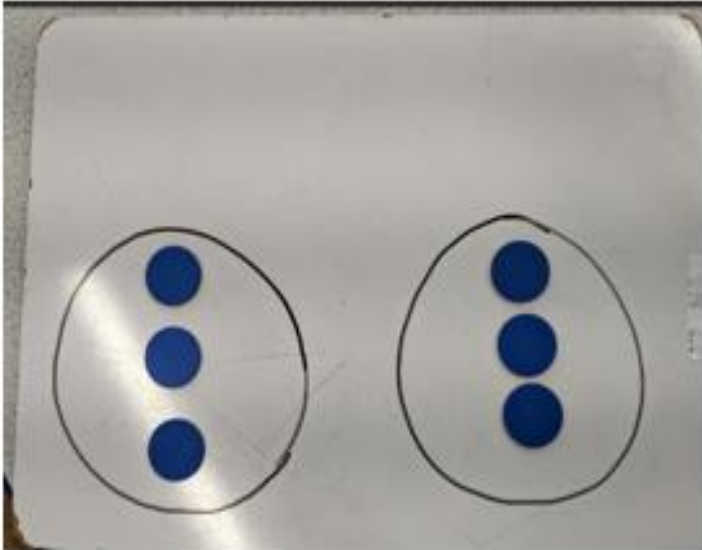
Multiplication in EYFS

Concrete

Children are shown a variety of real life groups and doubles and are asked to recognise patterns.

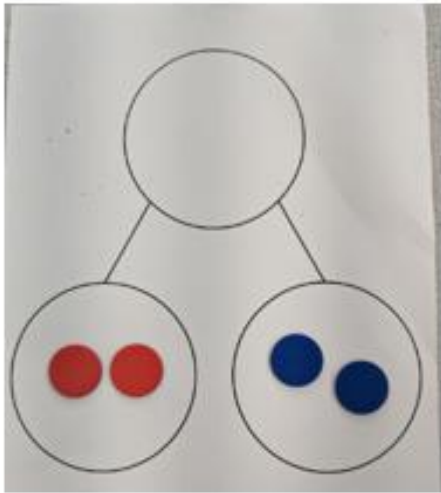


Multiplication in EYFS

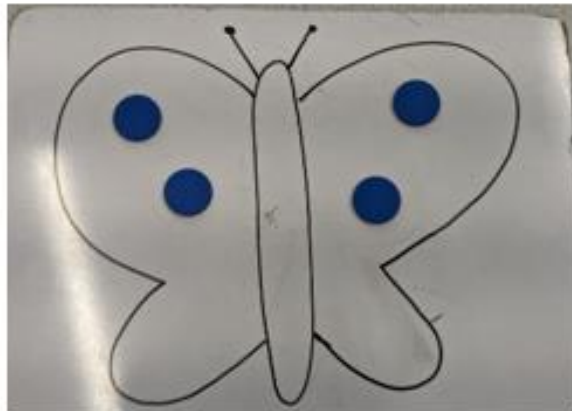


The question would be what is two groups of three? Or what is double three? Two groups are drawn and counters are laid out. Children will then count and see the answer is 6.

Multiplication in EYFS

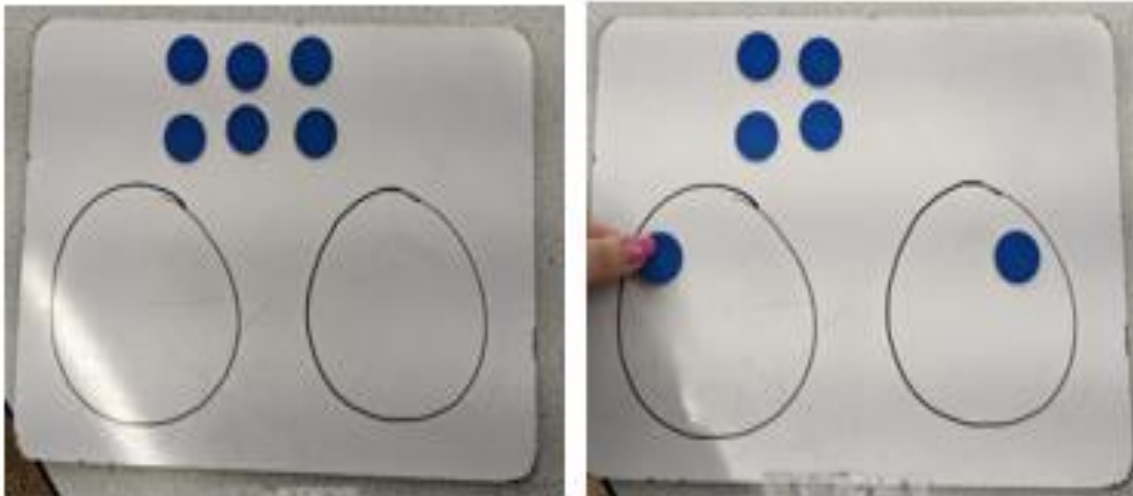


A part-part whole model is used to demonstrate two groups of two. The children will then drag the counters to the whole or build it in the whole number section.



A butterfly model is also used to show two groups of a number. This is an alternative representation.

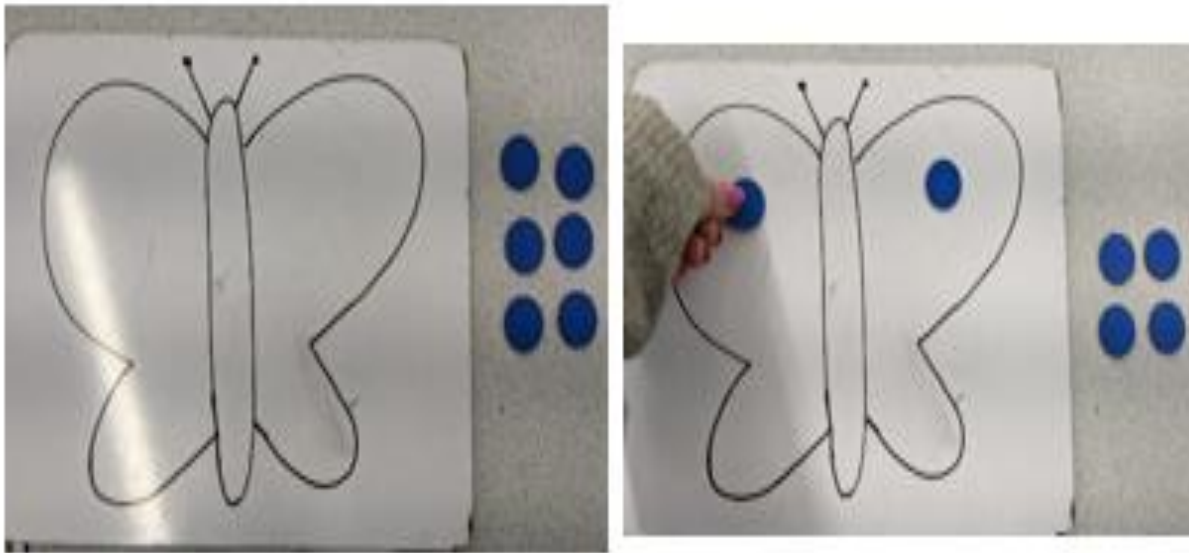
Division in EYFS



This example shows $6 \div 2 = 3$

Children would draw two groups that the number will be shared into. They will move one counter at a time until they have completed the number sentence.

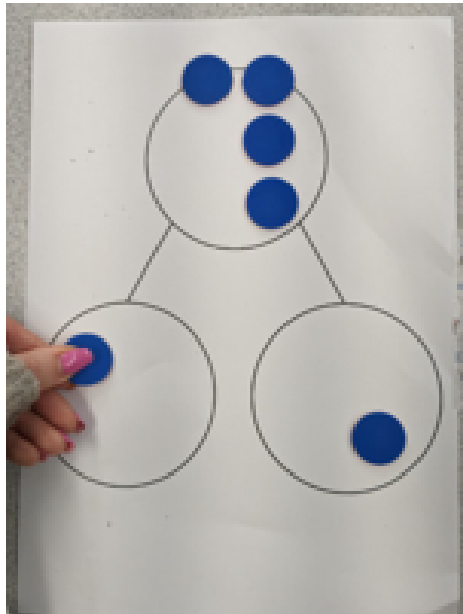
Division in EYFS



This example shows **$6 \div 2 = 3$**

Children would also be shown a butterfly model to demonstrate that the number has been shared equally.

Division in EYFS



This example shows $6 \div 2 = 3$

The children would then progress to use a part-part whole model. This develops understanding and shows that a whole number is being shared equally into two parts.

End of year maths targets in Year 1

Number – addition and subtraction

Statutory requirements

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.

End of year maths targets in Year 1

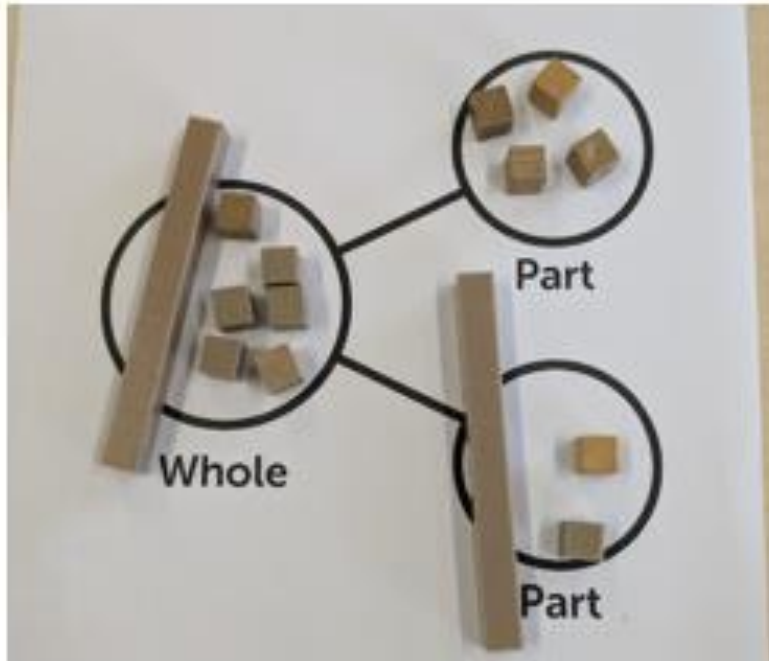
Number – multiplication and division

Statutory requirements

Pupils should be taught to:

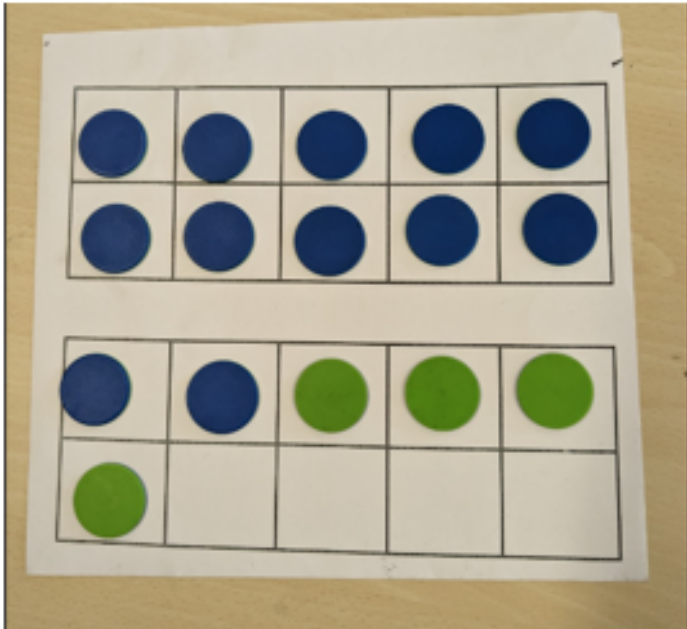
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Addition in Year 1



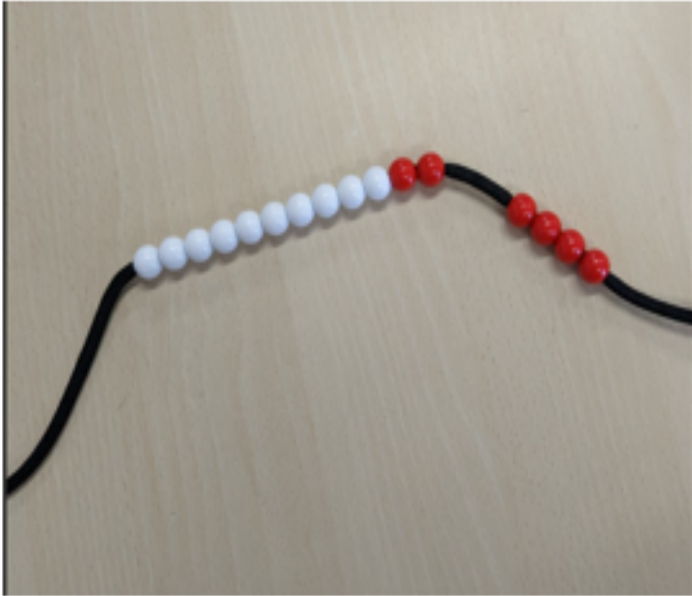
Dienes are introduced in a **part-part whole model** to demonstrate addition greater than 10. Children either move the dienes to create the whole number answer or create the whole number answer in the model. This demonstrates $12 + 4 = 16$

Addition in Year 1



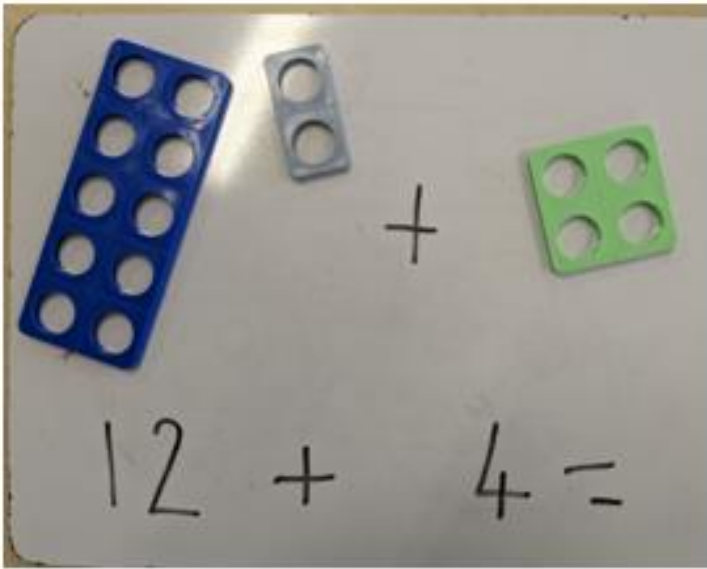
The children are shown a **tens frame** and will lay counters out using the different colours. This demonstrates $12 + 4 = 16$. The children will then count the counters to demonstrate that the whole number answer is 16. You have a 10 and 6 ones.

Addition in Year 1



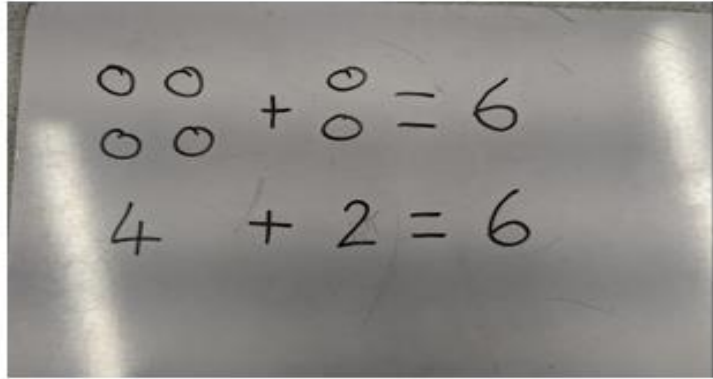
The children are shown a **bead string** and will create the number sentence. This demonstrates $12 + 4 = 16$. The children will then count the beads to demonstrate that the whole number answer is 16. You have a 10 and 6 ones. The beads can also be moved along the string.

Addition in Year 1

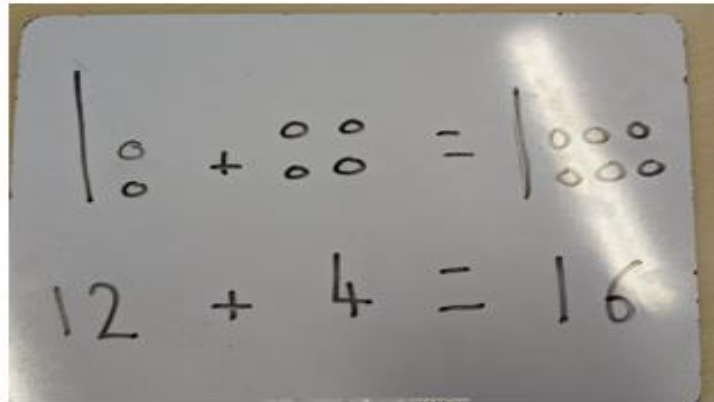


The children are shown numicon to represent number sentences. This example shows $12 + 4 = 16$. The numicon can also be put side by side to show the size of the 12 and 4 is the same as the 16.

Addition in Year 1



Progression from EYFS will show the children drawing the number sentence and writing the numerals underneath.



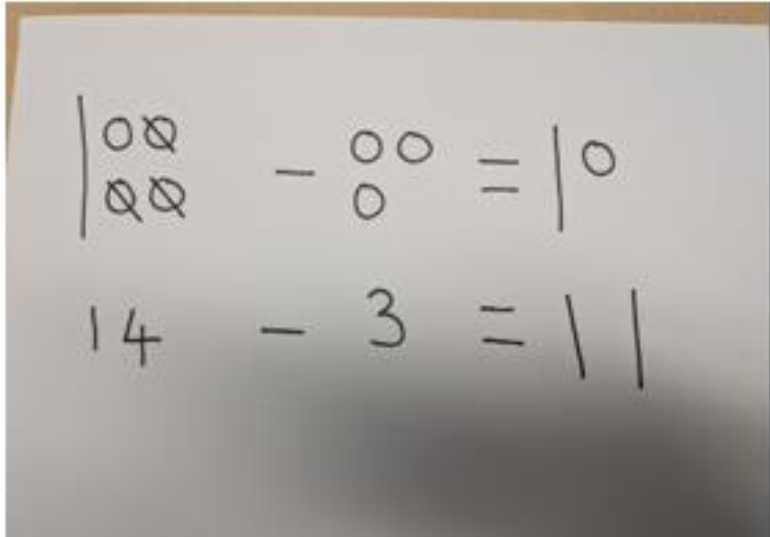
To draw a tens, a line is drawn. To draw ones, a small circle is drawn. The circles must be drawn and set out in the same pattern as numicon. This will make it clearer and easier to count to avoid errors.

Addition in Year 1



Children use the numberline to count on. This demonstrates $12 + 4 = 16$

Subtraction in Year 1



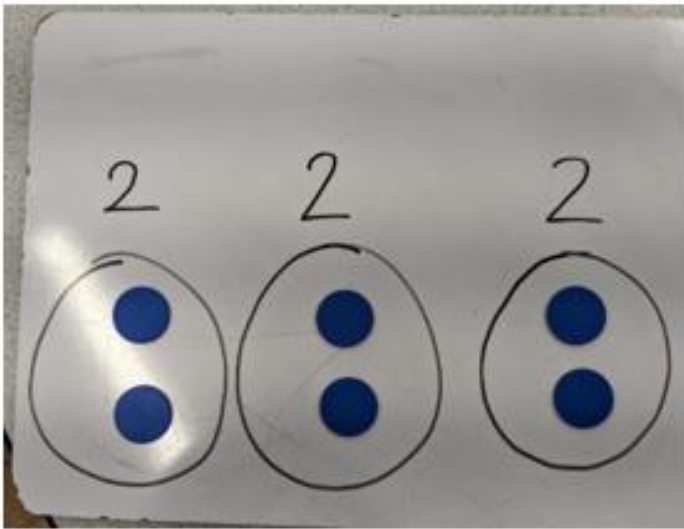
Drawings are used as in addition. When the whole number is drawn, the required amount is then rubbed/crossed out to leave the answer.

Subtraction in Year 1



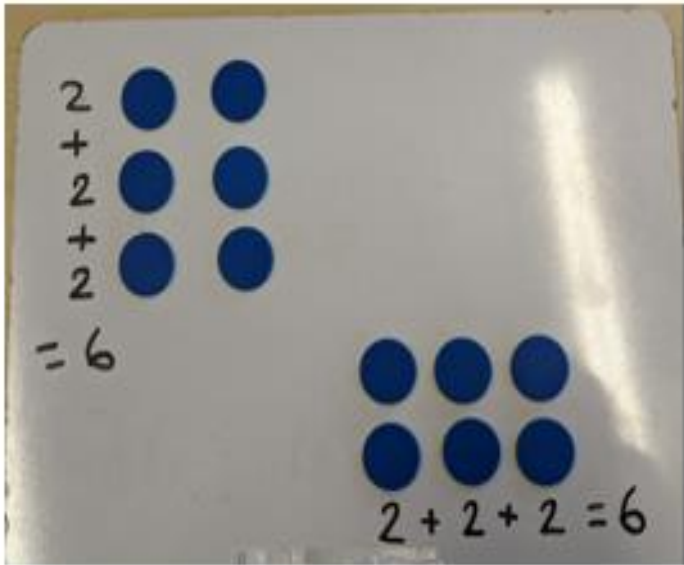
Children use the number line to count back. This demonstrates $16 - 4 = 12$

Multiplication in Year 1



The question would be what is three groups of two? Or what is triple 2? Three groups are drawn and counters are laid out. Children will then count and see the answer is 6. Children can also be encouraged to count in their 2s.

Multiplication in Year 1



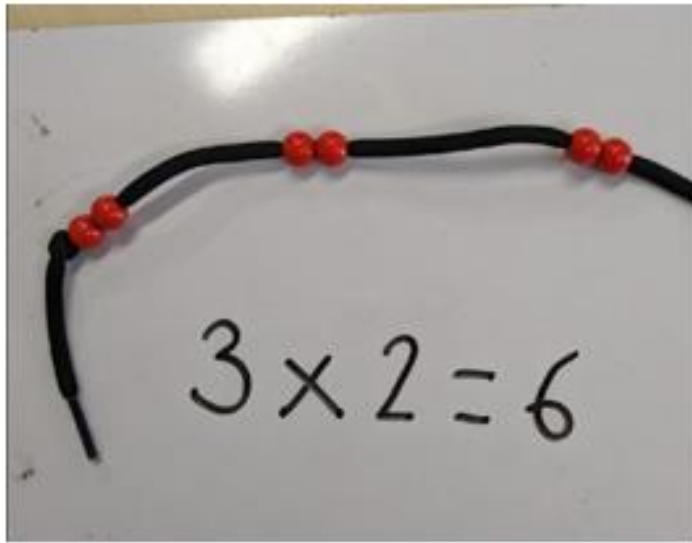
Arrays will then be built with counters to demonstrate the number sentences. This is taught as repeated addition. 3 groups of 2 is $2 + 2 + 2 = 6$.

Multiplication in Year 1



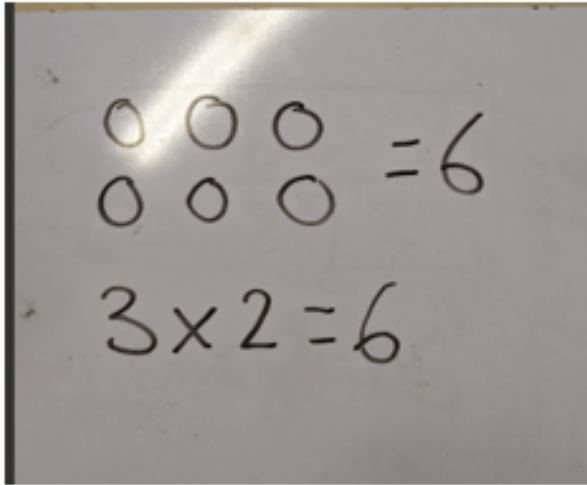
Arrays will be created using bead strings to demonstrate the number sentences. This is taught as repeated addition. 3 groups of 2 is $2 + 2 + 2 = 6$.

Multiplication in Year 1



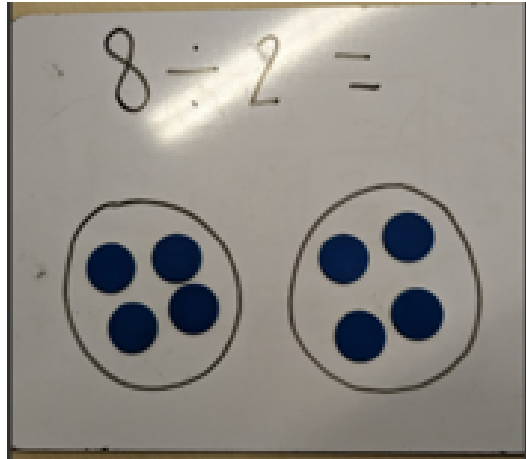
Arrays will be created using bead strings to demonstrate the number sentences. This is also taught as a multiplication number sentence. 3 groups of 2 is $3 \times 2 = 6$

Multiplication in Year 1



Arrays will then be drawn to demonstrate the number sentences. It is essential they are drawn neatly and in an organised way. This is taught as repeated addition and multiplication. 3 groups of 2 is $2 + 2 + 2 = 6$ or $3 \times 2 = 6$

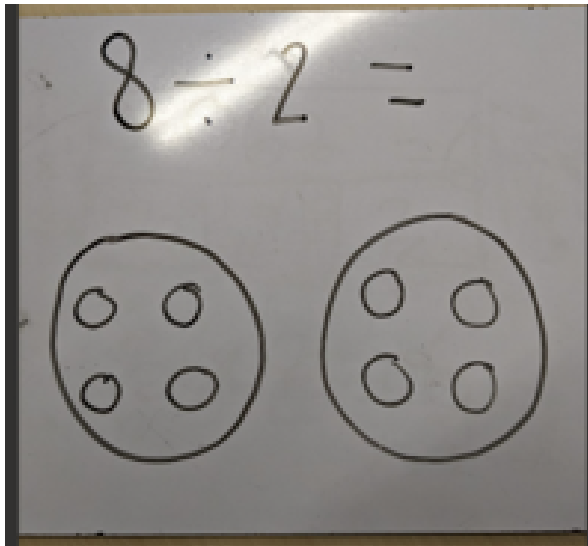
Division in Year 1



This example shows **$8 \div 2 = 4$**

The children would then progress to draw their own groups to share their counters into and would also write the numerals of the number sentence to increase understanding of division.

Division in Year 1



This example shows **$8 \div 2 = 4$**

The children would then progress to draw their own groups and then use their drawings to share the number. They will count out loud as they do this to avoid errors. They would continue to write the numerals of the number sentence to increase understanding of division.

Division in Year 1

Children would be given a question such as $6 \div 2 =$ and they would use their fingers to count in 2s up to 6. Say: 2, 4, 6 and you have three fingers up so your answer is 3.

End of year maths targets in Year 2

Statutory requirements

Pupils should be taught to:

- solve problems with addition and subtraction:
 - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
 - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
 - a two-digit number and ones
 - a two-digit number and tens
 - two two-digit numbers
 - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

End of year maths targets in Year 2

Statutory requirements

Pupils should be taught to:

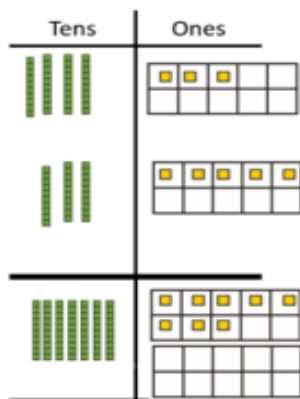
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals ($=$) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Addition in Year 2

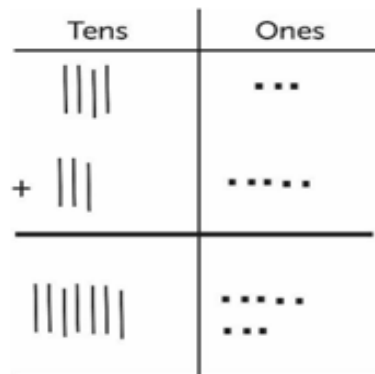
Methods

$$43 + 35 = 78$$

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r} 40 \quad 3 \\ + 30 \quad 5 \\ \hline 70 \quad 8 \end{array}$$

$$43 + 35 = 78$$

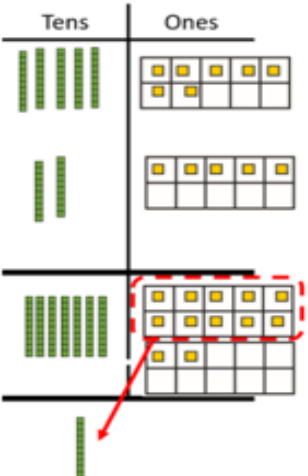
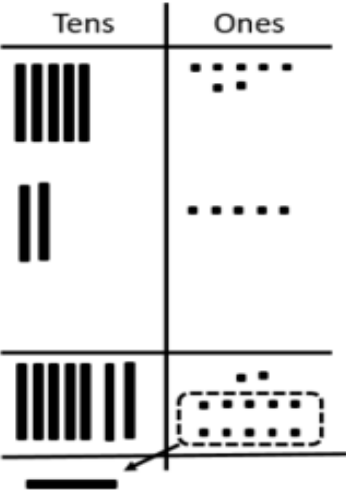
Abstract - Speaking frame

The sum of ... ones and ... ones is ... ones.
 The sum of ... tens and ... tens is ... tens.
 So, ... + ... is equal to ... tens and ... ones, which is ...

Addition in Year 2

When needing to carry the tens column.

$$57 + 25 = 92$$

Concrete	Pictorial	Abstract - Written symbolic
		$ \begin{array}{r} 50 + 7 \\ + 20 + 5 \\ \hline 80 + 12 \\ \hline 10 \quad 2 \\ \hline \end{array} $
		<div style="background-color: #f0e68c; padding: 5px; border: 1px solid black;"> $57 + 25 = 82$ </div>

Abstract - Speaking frame

The sum of ... ones and ... ones is ... ones.
 This is regrouped into ... ten and ... ones.
 The sum of ... tens and ... tens is ...tens.
 So, ... + ... is equal to ... tens and ... ones, which is ...

Addition in Year 2

If learning is secure, move onto using column method without writing the 10s.

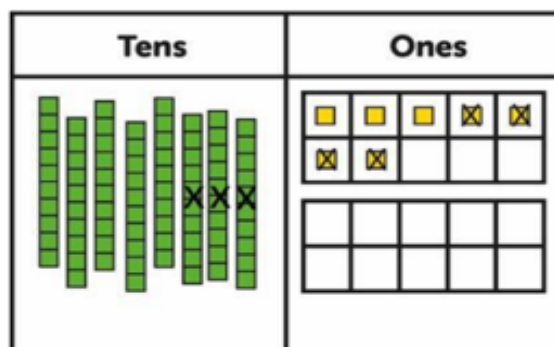
$$\begin{array}{r} + 57 \\ 25 \\ \hline 82 \\ \hline 1 \end{array}$$

Subtraction in Year 2

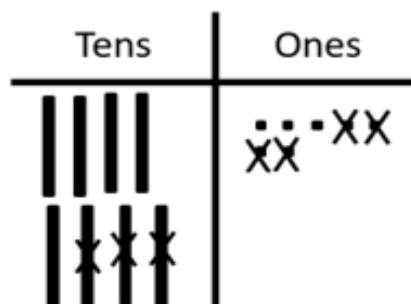
Methods

$$87 - 34 = 53$$

Concrete



Pictorial



Abstract - Written symbolic

$$\begin{array}{r|l} 80 & 7 \\ - 30 & 4 \\ \hline 50 & 3 \end{array}$$

$$87 - 34 = 53$$

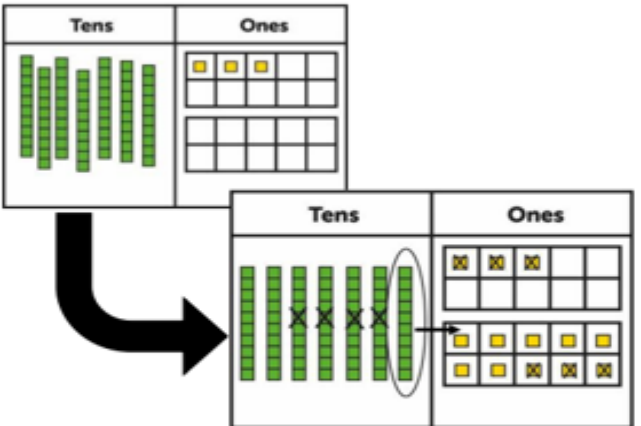
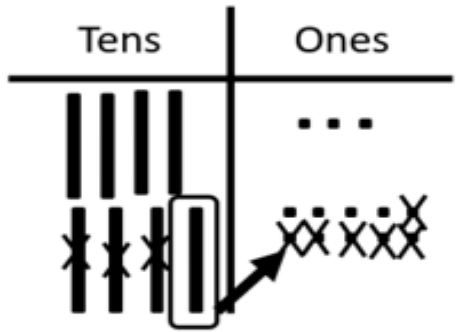
Abstract - Speaking frame

... ones take away ... ones leaves ... ones.
 ... tens take away ... tens leaves ... tens.
 So, ... - ... is equal to ... tens and ... ones, which is

Subtraction in Year 2

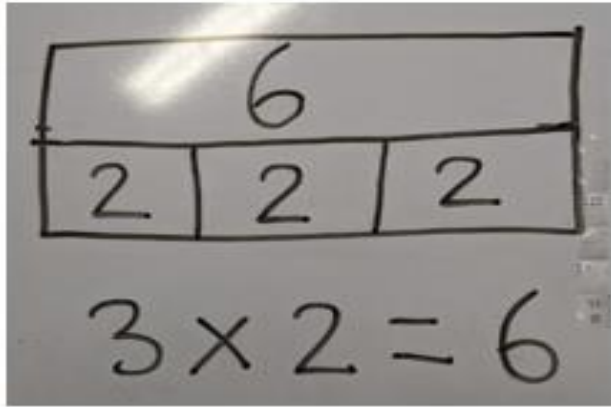
When exchanging

$$73 - 46 = 27$$

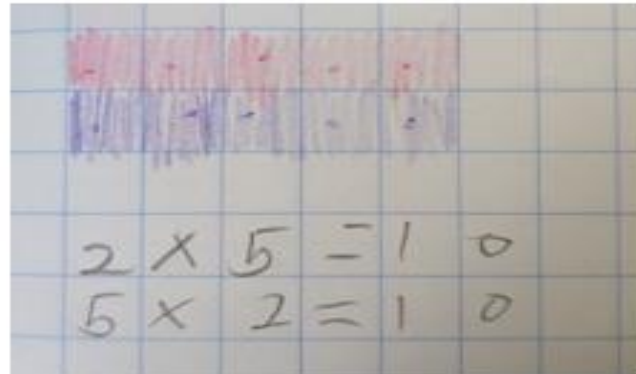
Concrete	Pictorial	Abstract - Written symbolic
		$ \begin{array}{r l} 60 & 13 \\ 70 & 3 \\ - 40 & 6 \\ \hline 20 & 7 \\ \hline \end{array} $ <div style="background-color: #d4edda; padding: 5px; border: 1px solid #c3e6cb; margin-top: 10px;"> $73 - 46 = 27$ </div>
<h3>Abstract - Speaking frame</h3> <div style="border: 2px solid orange; border-radius: 15px; padding: 10px; margin-top: 10px;"> <p> I can see that there aren't enough ones for me to take away ... ones without regrouping. Regroup one ten into ten ones. There are now ... tens and ... ones. ... ones take away ... ones leaves ... ones. ... tens take away ... tens leaves ... tens. So, ... - ... is equal to ... tens and ... ones, which is </p> </div>		

Multiplication in Year 2

Pictorial



A bar model is used to represent the number sentence. This is taught as repeated addition and multiplication. 3 groups of 2 is $2 + 2 + 2 = 6$ or $3 \times 2 = 6$



Children then will draw their own arrays to represent the number sentence. It is essential that the correct array for the number sentence is drawn. These arrays show 5 groups of 2 or $5 \times 2 = 10$ and also 2 groups of 5 or $2 \times 5 = 10$.

Multiplication in Year 2

Abstract

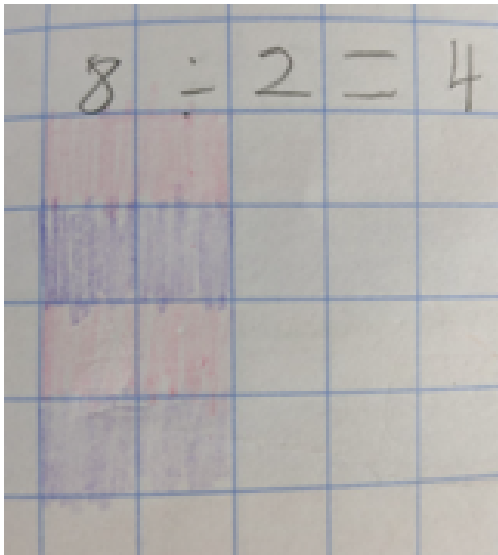
The written number sentence will be used and children are encouraged to count on their fingers when working a question out.

$$3 \times 2 = 6$$

Say: 3 groups of 2. Count up in 2s until you have 3 groups. 2,4,6 this answer is 6.

Division in Year 2

Dividing by Sharing



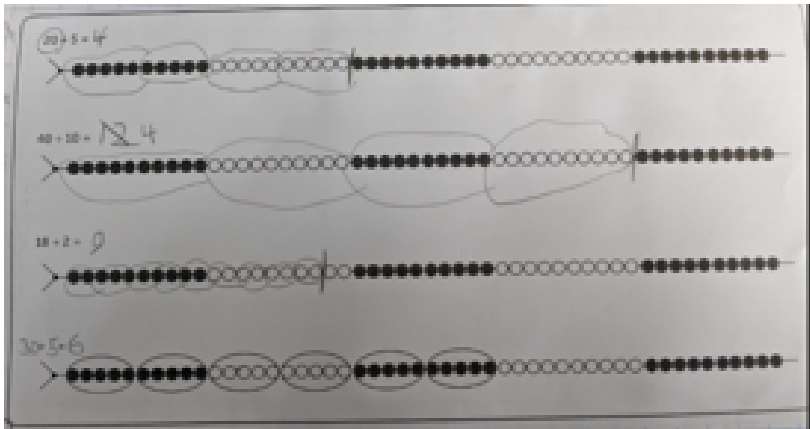
This example shows **$8 \div 2 = 4$**

The children would then progress to draw arrays to represent the number sentence. In this example, they will draw groups of 2 until they reach their desired number.

The division number sentence will be written to cement understanding.

Division in Year 2

Dividing by Grouping



Children will use bead strings and pictorial representations of bead strings to group numbers for division. They will count along the bead string and circle how many they need and will count how many groups they have once they have reached their desired number.

BPA's Calculation Policy

This will be uploaded on to our website within the next two weeks. All information contained in this presentation will be available for your to view at your leisure, alongside your child at home.

We will email an update when the calculation policy is live.

<http://bovingdonacademy.org.uk/>

Thank you for attending this
afternoon's maths meeting.

SUBTRACT
the negatives
to
ADD
more
positivity.