St. Mary's Catholic Primary School

Mathematics Calculations Policy

2026/27

OUR MISSION

TO LOVE GOD ABOVE ALL THINGS
BY
LEARNING TOGETHER
LOVING OURSELVES
LOVING EACH OTHER
LOVING ALL PEOPLE
LOVING LIFE ITSELF
AND
CONSTANTLY STRIVING FOR EXCELLENCE
WORTHY OF OUR GOD GIVEN GIFTS.

Year 1 and 2 (KS1)

Index

Introduction

pages 5-7

Addition and Subtraction- The Benefits of Different Representations

pages 8-24

Addition and Subtraction Calculation Strategies pages 25-35

Addition:

Year 1: Add with numbers up to 20

Key number skills needed for Year 1

- read and write numbers to 100 in numerals and 1-20 in words
- Recall bond to 10 and 20 and addition facts within 20
- Count to and across 100
- Count in multiples of 1, 2, 5, 10
- Solve simple 1-step problems involving addition, using objects, number lines and pictoral representations

Key number skills needed for Year 2

Year 2: Add with 2-digit numbers

- Add a 2-digit number and ones (e.g. 27 + 6)
- Add a 2-digit number and tens (e.g. 23 + 40)
- Add pairs of 2-digit numbers (e.g. 35 + 47)
- Add three single-digit numbers (e.g. 5 + 9 + 7)
- Show that adding can be done in any order (the commutative law).
- Recall bonds to 20 and bonds of tens to 100 (30 + 70 etc.)
- Count in steps of 2, 3 and 5 and count in tens from any number.
- Understand the place value of 2-digit numbers (tens and units)
- Compare and order numbers to 100 using < > and = signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.

Subtraction:

Year 1: Partitioning, reduction, difference, subtract numbers from 20

Key number skills needed for Year 1

- Given a number, say **one more or one less.**
- Count to and over 100, **forward and back**, from any number.
- Represent and use **subtraction facts to 20 and within 20.**
- Subtract with **one-digit and two-digit** numbers to 20, including zero.
- Solve one-step problems that involve addition and subtraction, using concrete objects (ie bead string,objects, cubes) and pictures, and missing number problems.
- Read and write numbers from 0 to 20 in numerals and words.

Year 2: Subtract with two-digit numbers

Key number skills needed for Year 2

- Recognise the place value of each digit in a two-digit number.
- Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100.
- Subtract using concrete objects, pictorial representations, 100 squares and mentally, including: a two-digit number and ones, a two-digit number and tens, and two two-digit numbers.
- Show that subtraction of one number from another cannot be done in any order.
- Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.
- Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation, and also applying their increasing knowledge of mental and written methods.
- Read and write numbers to at least 100 in numerals and in words.

Multiplication and Division – The Benefits of Different Representations

pages 36-46

Multiplication and Division Calculation Strategies pages 47-49

Multiplication:

Year 1: Multiply with concrete objects, arrays and pictorial representations

Key number skills needed for Year 1

- Count in multiples of 2, 5 and 10.
- Solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
- Make connections between arrays, number patterns, and counting in twos, fives and tens.
- Begin to understand doubling using concrete objects and pictorial representations.

Year 2: Multiply using arrays and repeated addition (using at least 2s, 5s and 10s)

Key number skills needed for Year 2

- Count in steps of 2, 3 and 5 from zero, and in 10s from any number.
- Recall and use multiplication facts from the 2, 5 and 10 multiplication tables, including recognising odd sand evens.
- Write and calculate number statements using the x and = signs.
- Show that multiplication can be done in any order (commutative).
- Solve a range of problems involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts.
- Pupils use a variety of language to discuss and describe multiplication.

Division:

Year 1: Recall and use halves of all numbers to 10

Key number skills needed for Year 1

- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations arrays with the support of the teacher
- Through grouping and sharing small quantities, pupils begin to understand, division, and finding simple fractions of objects, numbers and quantities.
- They make connections between arrays, number patterns, and counting in twos, fives and tens.

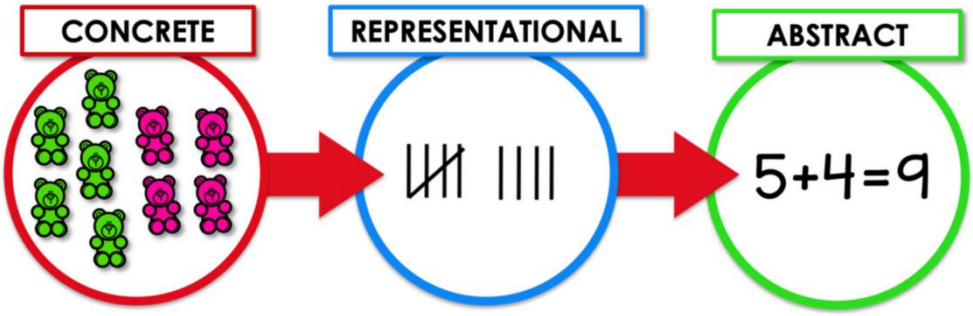
Year 2: Group and share, using the ÷ and = sign

Key number skills needed for Year 2

- Count in steps of 2, 3, and 5 from 0
- 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 x, ÷ and = 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.

At St Mary's Catholic Primary School, we believe that every child is uniquely created in the image and likeness of God and has the potential to achieve success in mathematics. Rooted in our Catholic values of respect, dignity, perseverance and excellence, we are committed to ensuring that all pupils can access and thrive within an ambitious mathematics curriculum. At the heart of our mastery approach to mathematics is the belief that all children can learn, make progress and develop a deep understanding of mathematical concepts. Rather than accelerating pupils through the National Curriculum, we provide opportunities for all learners to deepen their understanding through rich discussion, reasoning, problem solving and carefully designed variation. Similarly, calculation strategies are not taught as procedures to be memorised; pupils are expected to develop genuine conceptual understanding through the use of concrete resources, pictorial representations and abstract methods, enabling fluency, confidence and mathematical independence.

Central to our approach is the CPA (Concrete, Pictorial, Abstract) model of learning. We believe that children develop a secure and lasting understanding of mathematics when they are able to move confidently between practical experiences, visual representations and abstract symbols. Learning is strengthened through regular movement between these representations, allowing pupils to make connections and develop deeper mathematical understanding. Pupils who grasp concepts quickly are challenged through rich and sophisticated reasoning and problem-solving opportunities, while those who require additional practice are supported through consolidation, carefully planned scaffolding and further exposure to key concepts before moving on.



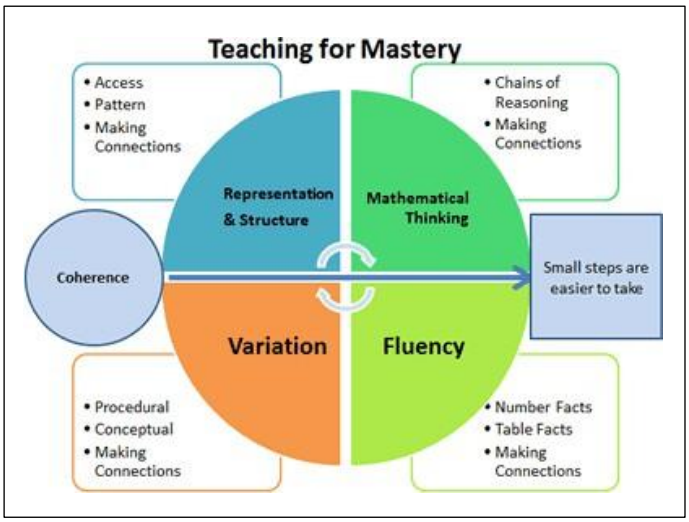
As part of our Teaching for Mastery approach, based on the NCETM Five Big Ideas and supported by White Rose Maths, we place a strong emphasis on developing fluency alongside conceptual understanding. This includes the secure recall of key number facts, number bonds and multiplication tables, which form the foundation for efficient calculation and higher-level mathematical thinking. Pupils are encouraged to reason mathematically, explain their thinking and apply their learning in a range of contexts.

This document outlines the progression of calculation strategies taught from Reception to Year 6 and reflects the expectations of the National Curriculum. It aims to provide a clear guide for teachers, parents and carers on the methods pupils will encounter throughout their primary education. Alongside written and mental calculation strategies, the guidance highlights the concrete resources, pictorial representations and mathematical structures that support understanding.

The progression has been carefully designed using current guidance from the NCETM, including Teaching for Mastery materials, Mastering Number, Curriculum Prioritisation and Ready to Progress resources, alongside White Rose Maths schemes of learning. While year group expectations are outlined, we recognise that children develop at different rates. Teachers

will use their professional judgement to ensure pupils are working at an appropriate stage, revisiting previous learning where necessary to secure understanding before moving forward.

This calculation progression document is based on key mastery principles as outlined in the diagram below:



Mathematical language

The 2014 National Curriculum is explicit in articulating the importance of children using the correct mathematical language as a central part of their learning. Indeed, in certain year groups, the non-statutory guidance highlights the requirement for children to extend their language around certain concepts.

It is therefore essential that teaching using the strategies outlined in this policy is accompanied by the use of appropriate mathematical vocabulary. New vocabulary should be introduced in a suitable context (for example, with relevant real objects, apparatus, pictures or diagrams) and explained carefully.

High expectations of the mathematical language used are essential, with teachers only accepting what is correct.

Correct	Incorrect
ones	units
Is equal to	equals
Zero	(oh) The letter o

The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof.

2014 Maths Programme of Study

The expectation is that pupils will, at all times, answer in full sentences.

Sentence stems can be used to help pupils with this if required.

Acceptable	Unacceptable
Seven add three is equal to ten.	10
Three groups of five is fifteen.	15
Two and three makes five, Five is made of two and three.	5

Addition and Subtraction

Part-Whole (Cherry) Model

Benefits

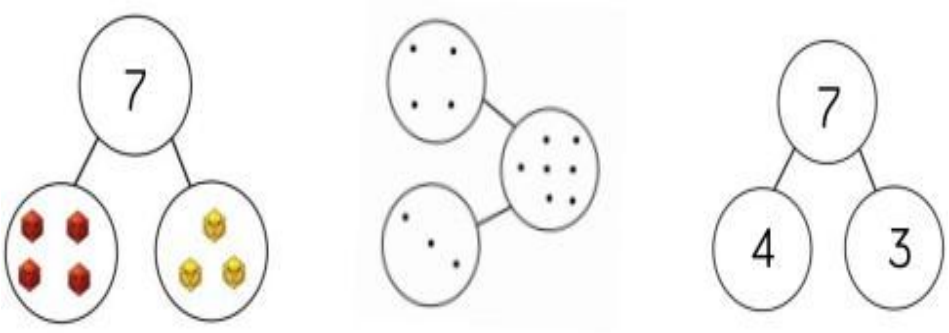
The part-whole model supports children in their understanding of aggregation and partitioning. Due to its shape, it can be referred to as a cherry part-whole model.

When the parts are complete and the whole is empty, children use aggregation to add the parts together to find the total.

When the whole is complete and at least one of the parts is empty, children use partitioning (a form of subtraction) to find the missing part.

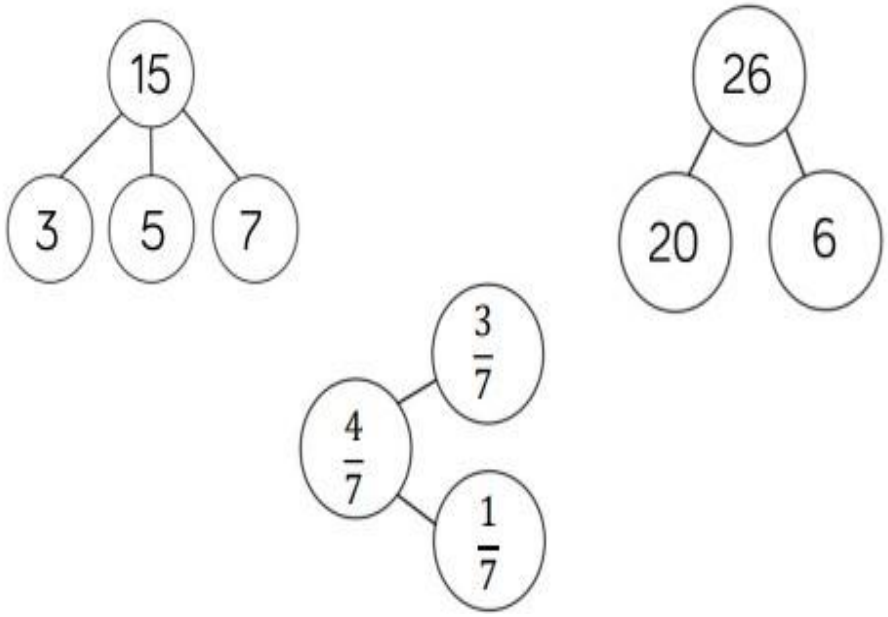
Part-whole models can be used to partition a number into two or more parts, or to help children partition a number into tens and ones or other place value columns.

In KS2, children can apply their understanding of the part-whole model to add and subtract decimals and percentages.



$7 = 4 + 3$ $\quad 7 - 3 = 4$

$7 = 3 + 4$ $\quad 7 - 4 = 3$



Bar Model (Part- Whole Relationship)

Benefits

The single bar model is another type of a part-whole model that can support children in representing calculations to help them unpick the structure.

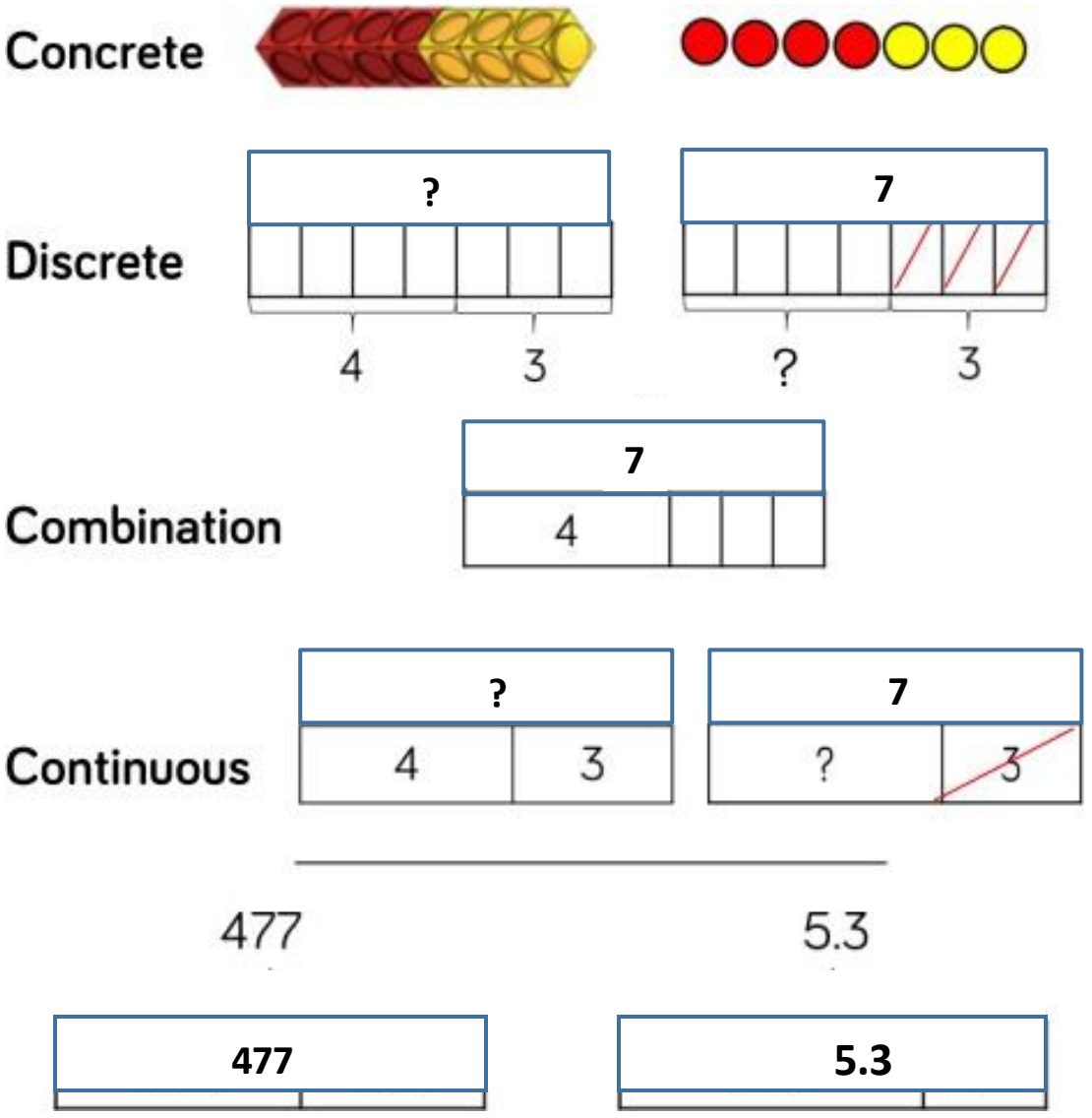
Cubes and counters can be used in a line as a concrete representation of the bar model.

Discrete bar models are a good starting point with smaller numbers. Each box represents one whole.

The combination bar model can support children to calculate by counting on from the larger number. It is a good stepping stone towards the continuous bar model.

Continuous bar models are useful for a range of values. Each rectangle represents a number. The question mark indicates the value to be found.

In KS2, children can use bar models to represent larger numbers, decimals and fractions.



Bar Model (Multiple)

Benefits

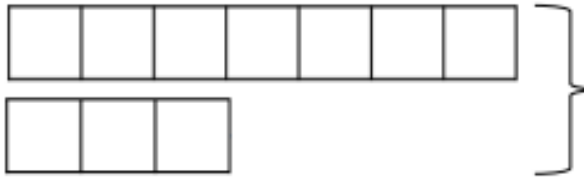
The multiple bar model is a good way to compare quantities whilst still unpicking the structure.

Two or more bars can be drawn, with a bracket labelling the whole positioned on the right-hand side of the bars. Smaller numbers can be represented with a discrete bar model whilst continuous bar models are more effective for larger numbers.

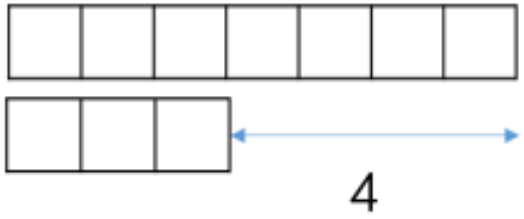
Multiple bar models can also be used to represent the difference in subtraction. An arrow can be used to model the difference.

When working with smaller numbers, children use cubes and a discrete model to find the difference. This supports children to see how counting on can help when finding the difference.

Discrete

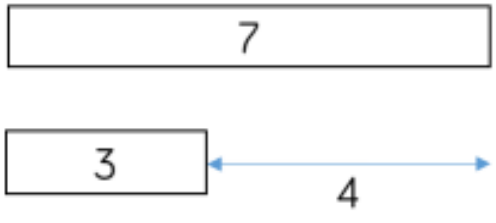


$7 + 3 = 10$

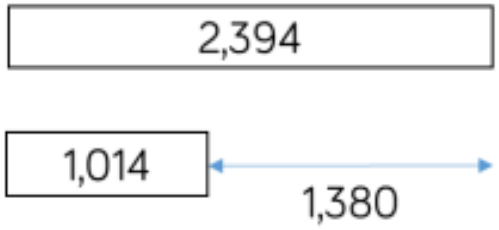


$7 - 3 = 4$

Continuous



$7 - 3 = 4$



$2{,}394 - 1{,}014 = 1{,}380$

Number Shapes

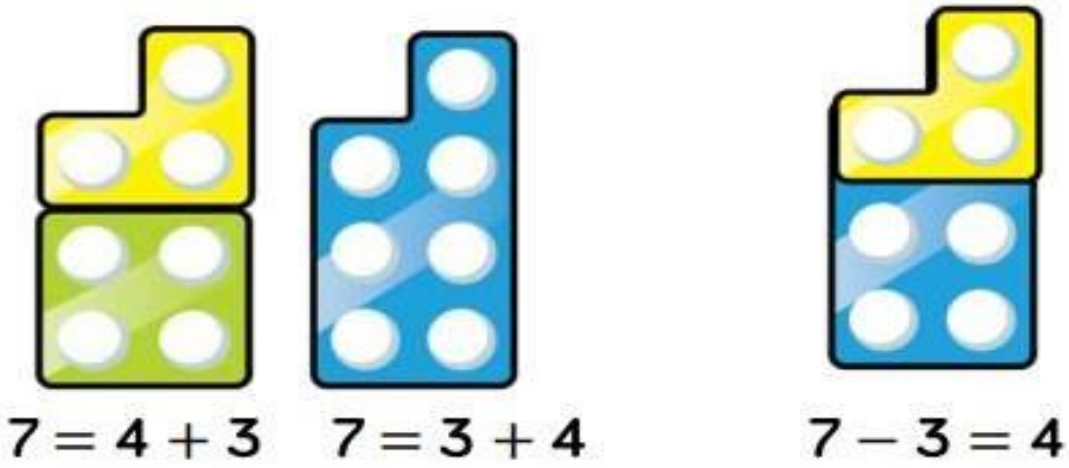
Benefits

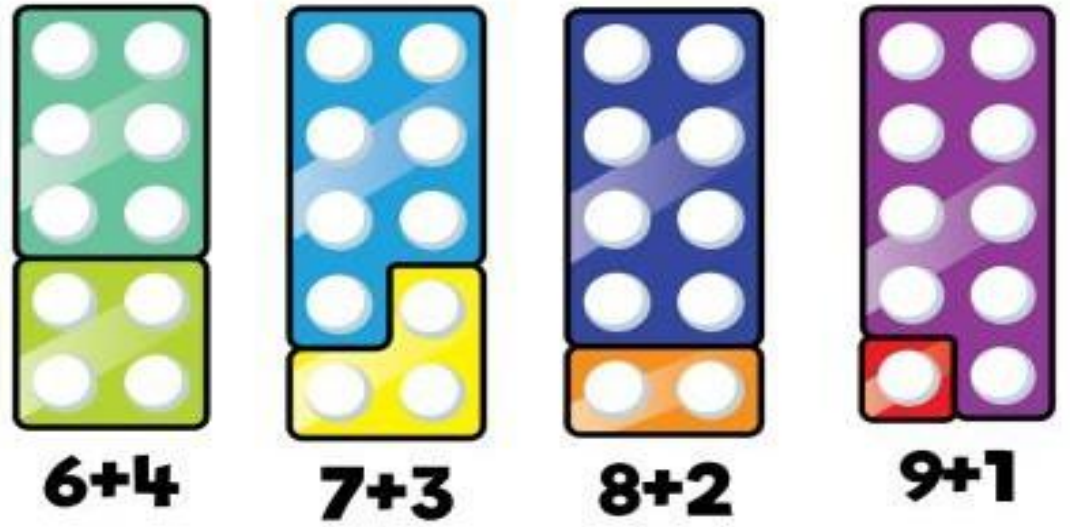
Number shapes can be useful to support children to subitise as well as explore aggregation, partitioning and number bonds.

When adding numbers, children can see how the parts come together making a whole. As children use number shapes more often, they can start to subitise the total due to their familiarity with the shape of each number.

When subtracting numbers, children can start with the whole and then place one of the parts on top of the whole to see what part is missing. Again, children will start to be able to subitise the part that is missing due to their familiarity with the shapes.

Children can also work systematically to find number bonds. As they increase one number by 1, they can see that the other number decreases by 1 to find all the possible number bonds for a number.





Cubes

Benefits

Cubes can be useful to support children with the addition and subtraction of one-digit numbers.

When adding numbers, children can see how the parts come together to make a whole. Children could use two different colours of cubes to represent the numbers before putting them together to create the whole.

When subtracting numbers, children can start with the whole and then remove the number of cubes that they are subtracting in order to find the answer. This model of subtraction is reduction, or take away.

Cubes can also be useful to look at subtraction as difference. Here, both numbers are made and then lined up to find the difference between the numbers.

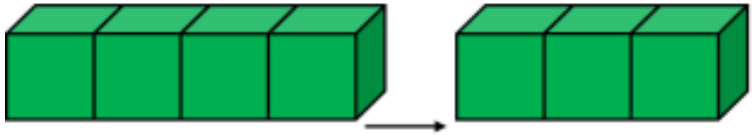
Cubes are useful when working with smaller numbers but are less efficient with larger numbers as they are difficult to subitise and children may miscount them.



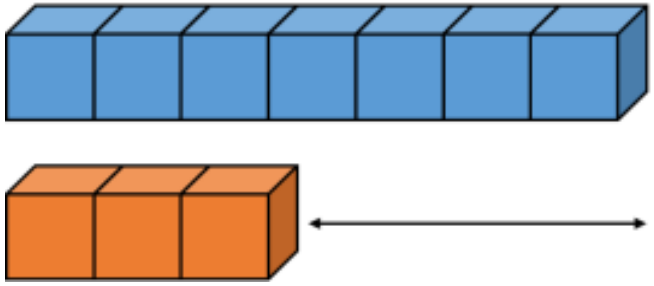
$7 = 4 + 3$



$7 = 3 + 4$



$7 - 3 = 4$



$7 - 3 = 4$

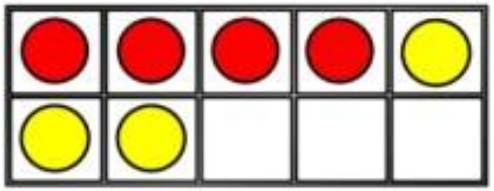
Ten Frames (within 10)

Benefits

When adding and subtracting within 10, the ten frame can support children to understand the different structures of addition and subtraction.

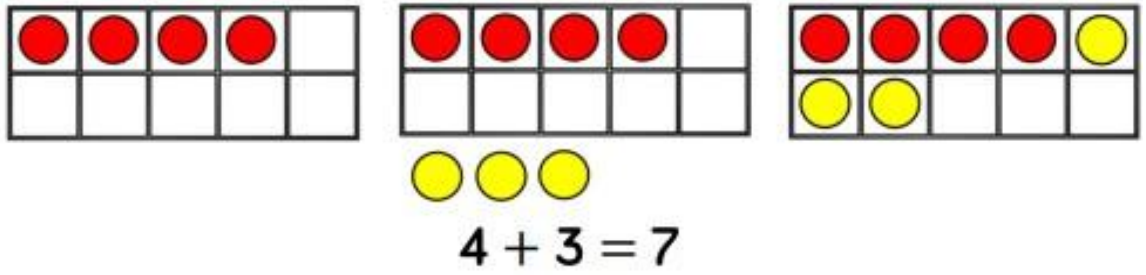
Using the language of parts and wholes represented by objects on the ten frame introduces children to aggregation and partitioning. Aggregation is a form of addition where parts are combined together to make a whole. Partitioning is a form of subtraction where the whole is split into parts. Using these structures, the ten frame can enable children to find all the number bonds for a number.

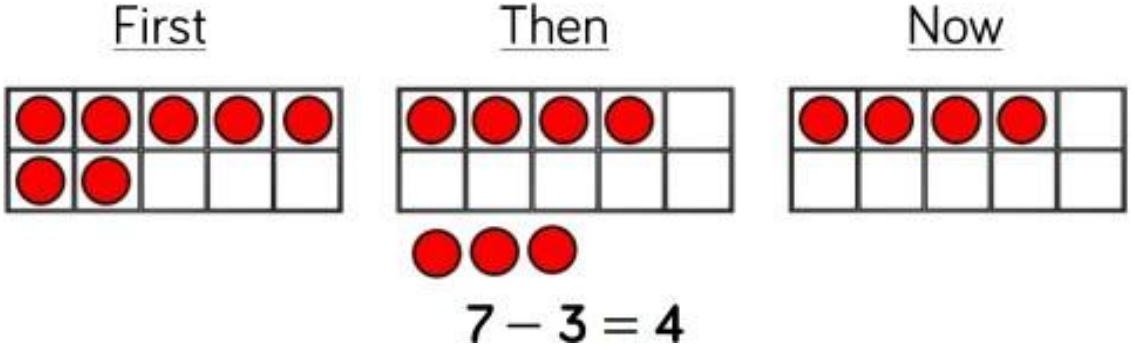
Children can also use ten frames to look at augmentation (increasing a number) and take-away (decreasing a number). This can be introduced through a first, then, now structure which shows the change in the number in the 'then' stage. This can be put into a story structure to help children understand the change eg First, there were 7 cars. Then, 3 cars left. Now, there are 4 cars.



$4 + 3 = 7$
$3 + 4 = 7$
$7 - 3 = 4$
$7 - 4 = 3$

4 is a part.
3 is a part.
7 is the whole.





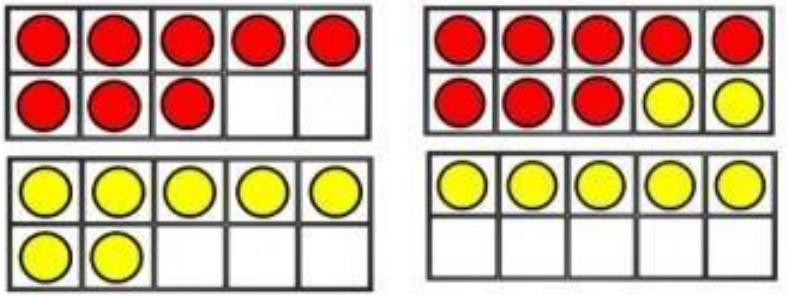
Ten Frames (within 20)

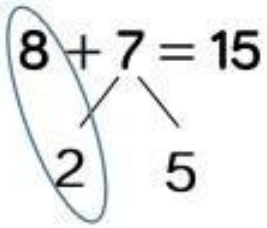
Benefits

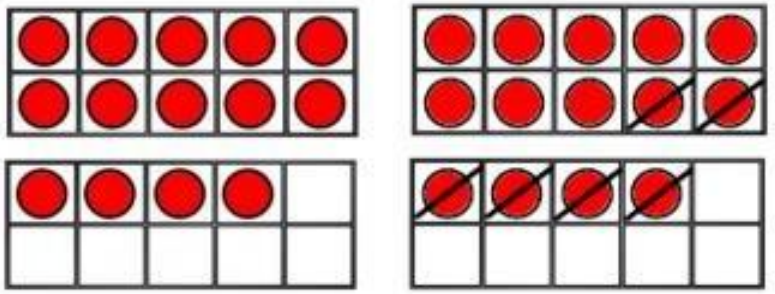
When adding two single digits, children can make each number on separate ten frames before moving part of one number to make 10 on one of the ten frames. This supports children to see how they have partitioned one of the numbers to make 10, and make links to effective mental methods of addition.

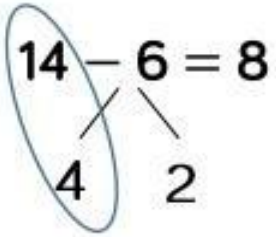
When subtracting a one-digit number from a two-digit number, firstly make the larger number on 2 ten frames. Remove the smaller number, thinking carefully about how you have partitioned the number to make 10, this supports mental methods of subtraction.

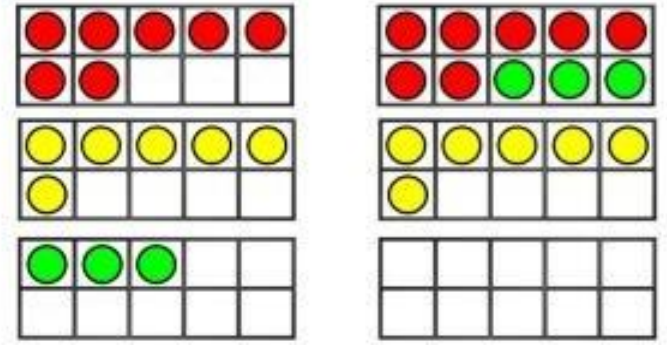
When adding 3 single-digit numbers, children can make each number on 3 separate 10 frames before considering which order to add the numbers in. they may be able to find a number bond to 10 which makes the calculation easier. Once again, the ten frames support the link to effective mental methods of addition as well as the importance of commutativity.

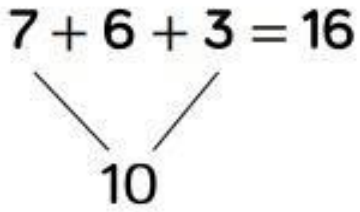












Bead Strings

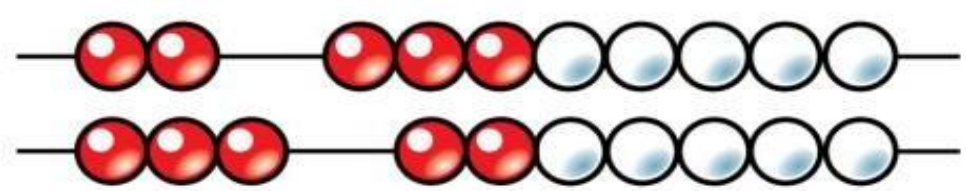
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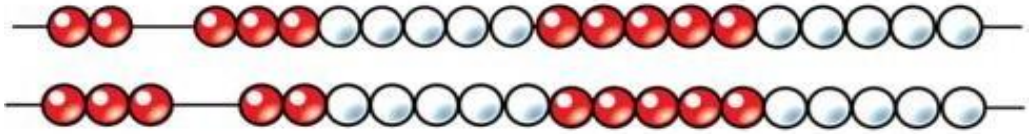
Different sizes of bead strings can support children at different stages of addition and subtraction.

Bead strings to 10 are very effective at helping children to investigate number bonds up to 10. They can help children to systematically find all the number bonds to 10 by moving one bead at a time to see the different numbers they have partitioned the 10 beads into eg 2 + 8 = 10, move one bead, 3 + 7 = 10.

Bead strings to 20 work in a similar way but they also group the beads in fives. Children can apply their knowledge of number bonds to 10 and see the links to number bonds to 20.

Bead strings to 100 are grouped in tens and can support children in number bonds to 100 as well as helping when adding by making 10. Bead strings can show a link to adding to the next 10 on number lines which supports a mental method of addition.









Number Tracks

Benefits

Number tracks are useful to support children in their understanding of augmentation and reduction.

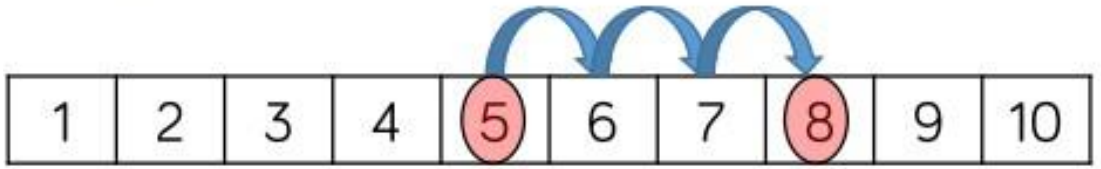
When adding, children count on to find the total of the numbers. On a number track children can place a counter on the starting number and then count on to find the total.

When subtracting, children count back to find their answer. They start at the minuend and then take away the subtrahend to find the difference between the numbers.

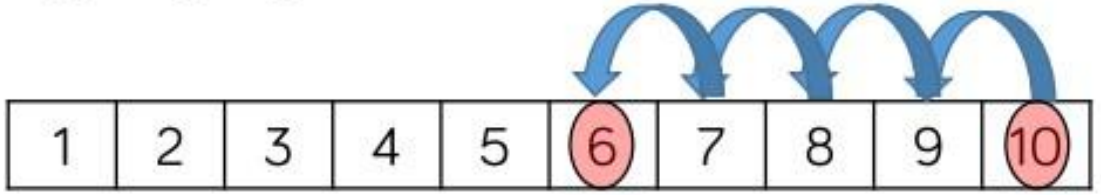
Number tracks can work well alongside ten frames and bead strings which can model counting on or counting back.

Playing board games can help children to become familiar with the idea of counting on using a number track before they move on to number lines.

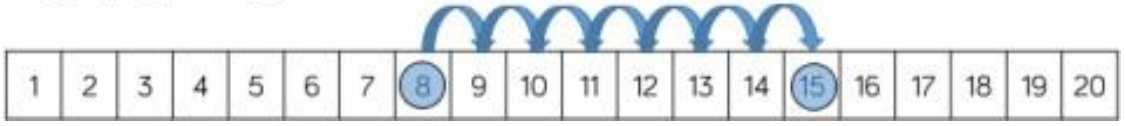
$5 + 3 = 8$



$10 - 4 = 6$



$8 + 7 = 15$



Number Lines (labelled)

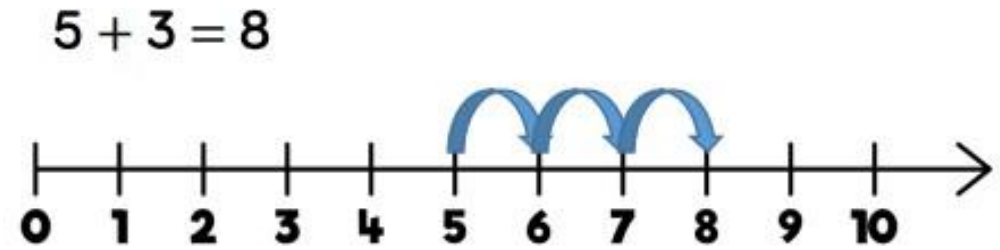
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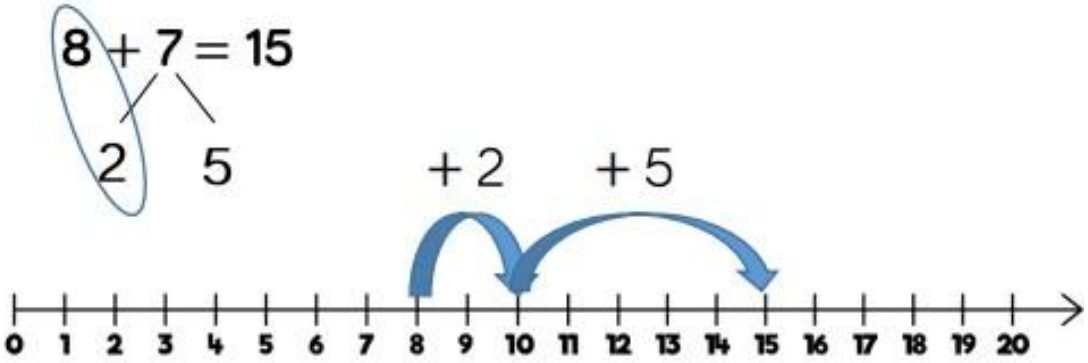
Labelled number lines support children in their understanding of addition and subtraction as augmentation and reduction.

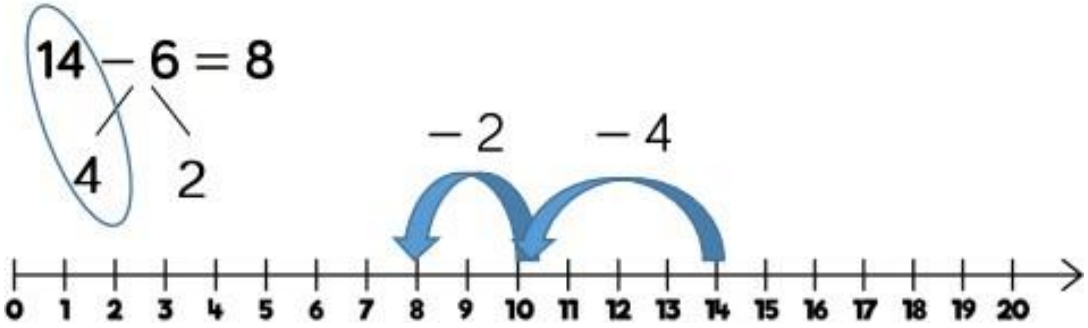
Children can start by counting on or back in ones, up or down the number line. This skill links directly to the use of the number track.

Progressing further, children can add numbers by jumping to the nearest 10 and then jumping to the total. This links to the making 10 method which can also be supported by ten frames. The smaller number is partitioned to support children to make a number bond to 10 and to then add on the remaining part.

Children can subtract numbers by firstly jumping to the nearest 10. Again, this can be supported by ten frames so children can see how they partition the smaller number into the two separate jumps.







Number Lines (blank)

Benefits

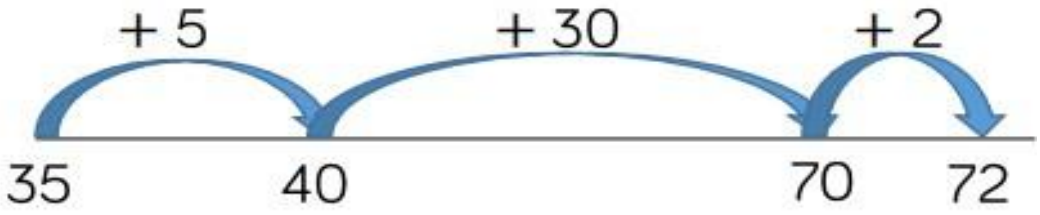
Blank number lines provide children with a structure to add and subtract numbers in smaller parts.

Developing from labelled number lines, children can add by jumping to the nearest 10 and then adding the rest of the number either as a whole or by adding the tens and ones separately.

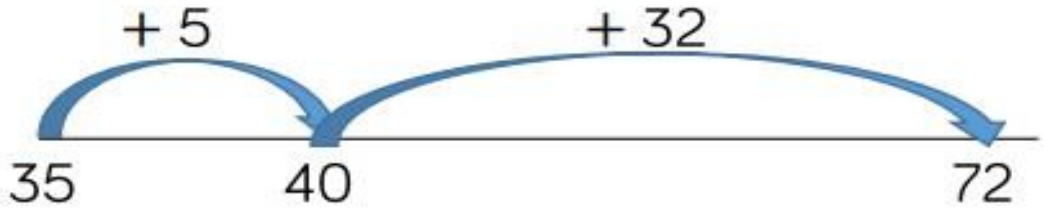
Children may also count back on a number line to subtract, again by jumping to the nearest 10 and then subtracting the rest of the number.

Blank number lines can also be used effectively to help children subtract by finding the difference between numbers. This can be done by starting with the smaller number and then counting on to the larger number. They then add up the parts they have counted on to find the difference between the numbers.

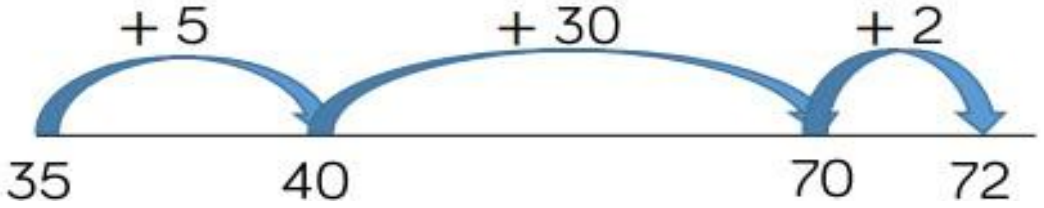
35 + 37 = 72



35 + 37 = 72



72 − 35 = 37



Straws

Benefits

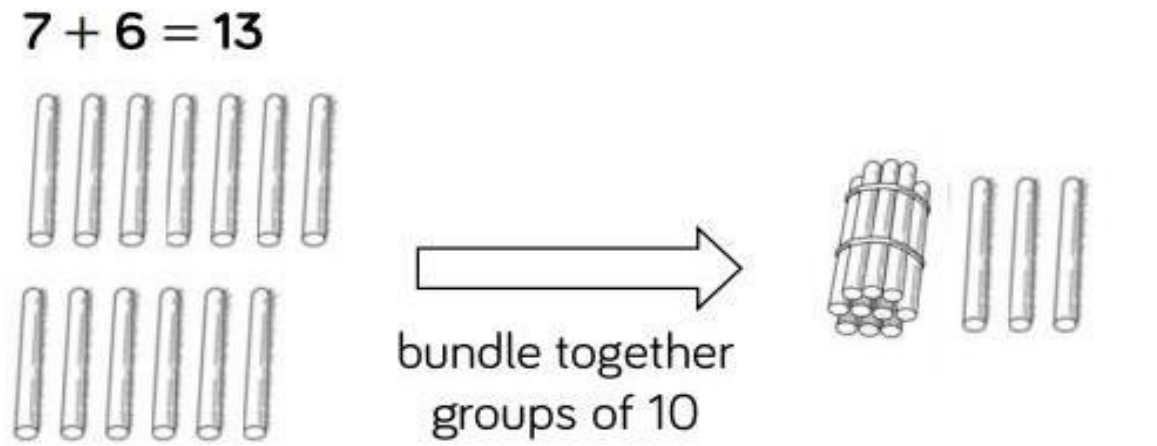
Straws are an effective way to support children in their understanding of exchange when adding and subtracting 2-digit numbers.

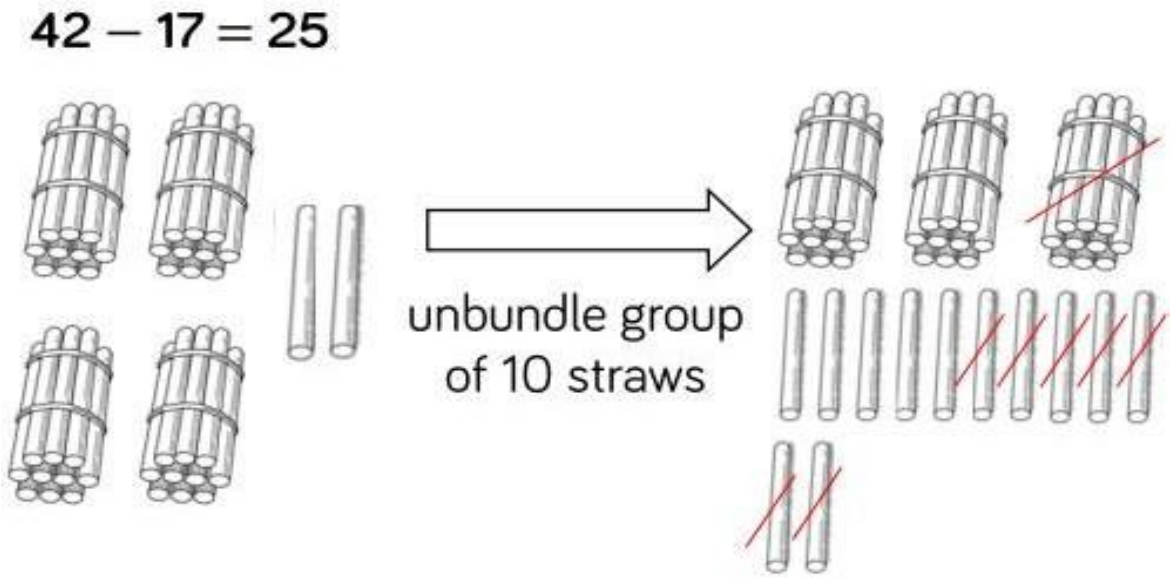
Children can be introduced to the idea of bundling groups of 10 when adding smaller numbers and when representing 2-digit numbers.

When adding numbers, children bundle a group of 10 straws to represent the exchange from 10 ones to 1 ten. They then add the individual straws (ones) and bundles of straws (tens) to find the total.

When subtracting numbers, children unbundle a group of 10 straws to represent the exchange from 1 ten to 10 ones.

Straws provide a good stepping stone to adding and subtracting with Base 10/Dienes.





Base 10 /Dienes (addition)

Benefits

Using Base 10 is an additional way to support children's understanding of column addition. It is important that children write out their calculations alongside using or drawing Base 10 so they can see the clear links between the written method and the model.

Children should first add without an exchange before moving on to addition with exchange. The representation becomes less efficient with larger numbers due to the size of Base 10. In this case, place value counters may be the better model to use.

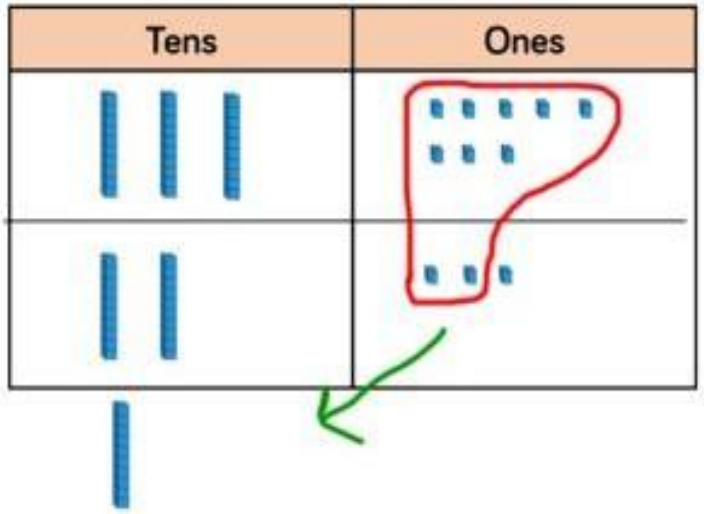
When adding, always start with the smallest place value column. Here are some questions to support children.

How many ones are there altogether?

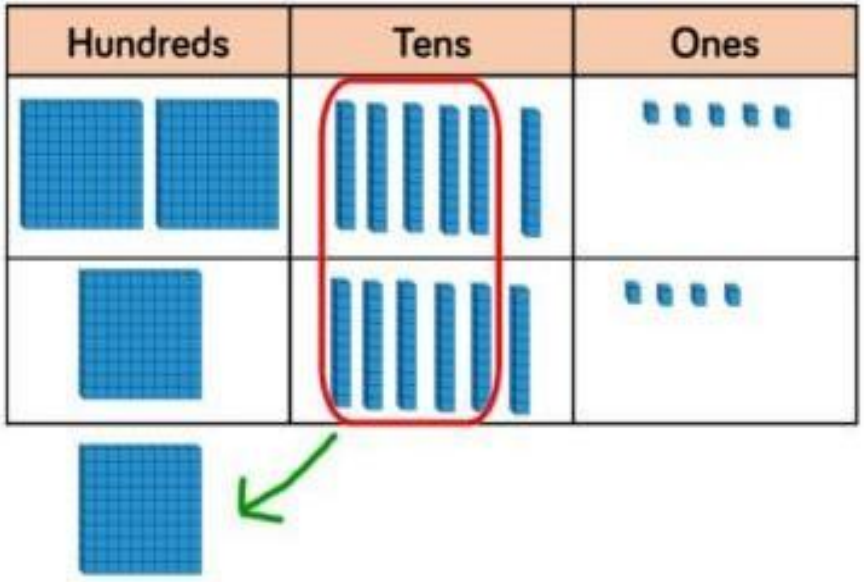
Can we make an exchange?

How many do we exchange? (10 ones for 1 ten, show exchanged 10 in tens column by writing 1 in column)

How many ones do we have left? (write in ones column)



$$\begin{array}{r} 38 \\ +\,23 \\ \hline 61 \\ \hline 1 \end{array}$$



$$\begin{array}{r} 265 \\ +\,164 \\ \hline 429 \\ \hline 1 \end{array}$$

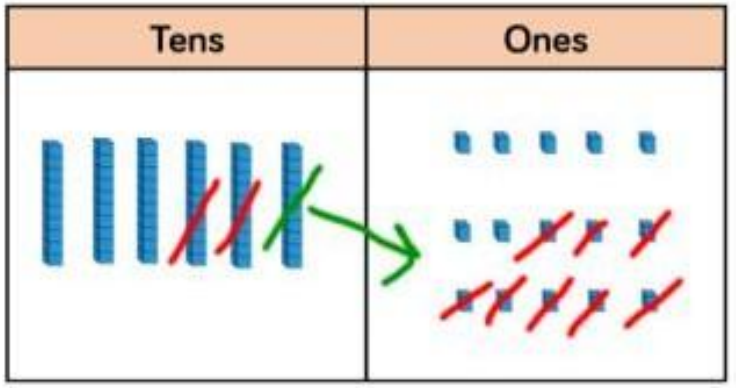
Base 10 /Dienes (subtraction)

Benefits

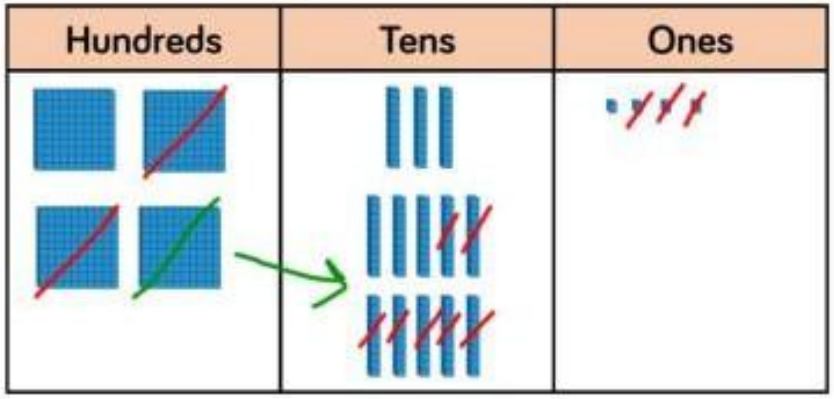
Using Base 10 is an effective way to support children's understanding of column subtraction. It is important that children write out their calculations alongside using or drawing Base 10 so they can see the clear links between the written method and the model.

Children should first subtract without an exchange before moving on to subtraction with exchange. When building the model, children should just make the minuend using Base 10, they then subtract the subtrahend. Highlight this difference to addition to avoid errors by making both numbers. Children start with the smallest place value column. When there are not enough ones/tens/hundreds to subtract in a column, children need to move to the column to the left to exchange eg exchange 1 ten for 10 ones. They can then subtract efficiently.

This model is efficient with up to 4-digit numbers. Place value counters are more efficient with larger numbers and decimals.



$$\begin{array}{r} {}^{5}\not{6}\,{}^{1}\not{5} \\ -\ 28 \\ \hline 37 \end{array}$$



$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}\not{3}\not{5} \\ -\ 273 \\ \hline 262 \end{array}$$

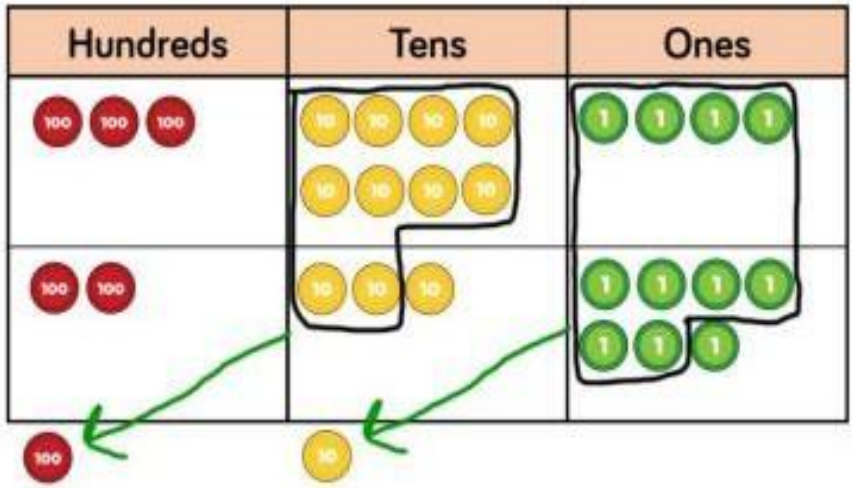
Place Value Counters (addition)

Benefits

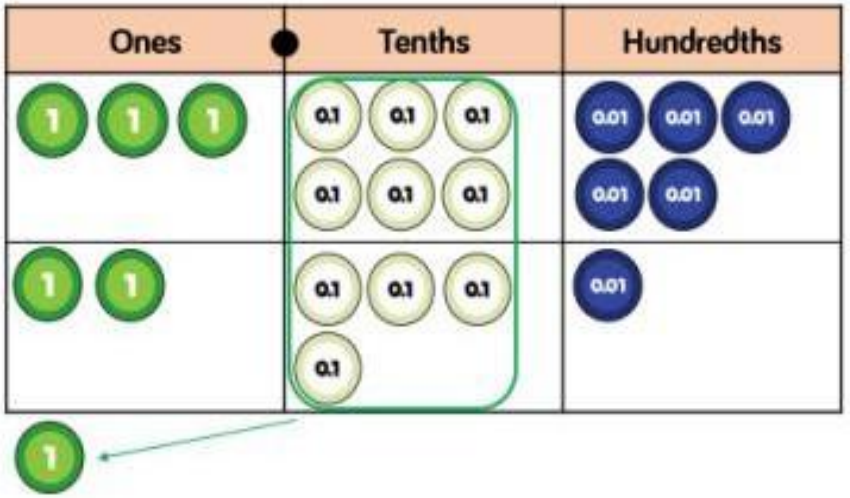
Using place value counters is an effective way to support children's understanding of column addition. It is important that children write out their calculations alongside using or drawing counters so that they can see the clear links between the written method and the model.

Children should first add without exchange before moving on to addition with exchange. Different place value counters can be used to represent larger numbers or decimals. They should be used on a place value grid to enable children to experience the exchange between columns.

When adding money, children can also use coins to support their understanding. It is important that children consider how the coins link to the written calculation especially when adding decimal amounts.



$$\begin{array}{r} 384 \\ +\,237 \\ \hline 621 \\ \hline 1\ 1 \end{array}$$



$$\begin{array}{r} 3.65 \\ +\,2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$$

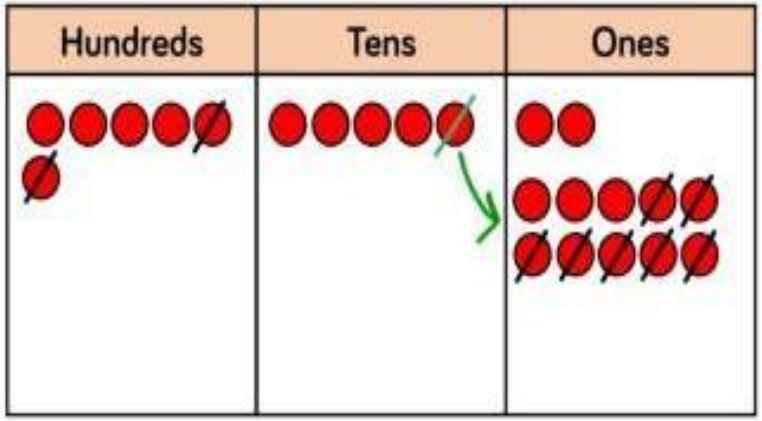
Place Value Counters (addition)

Benefits

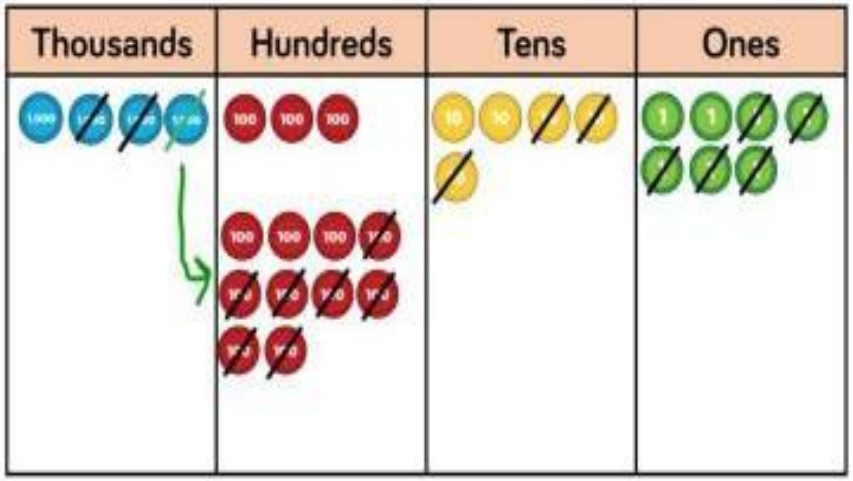
Using place value counters is an effective way to support children's understanding of column subtraction. It is important that children write out their calculations alongside using or drawing counters so that they can see the clear links between the written method and the model.

Children should first subtract without an exchange before moving on to subtraction with exchange. The counters should be put on a place value grid to enable children to experience the exchange between columns.

When building the model, children should just make the minuend using counters, they then subtract the subtrahend. Children start with the smallest place value column. When there are not enough ones/tens/hundreds to subtract in a column, children need to move to the column to the left and exchange eg exchange 1 ten for 10 ones. They can then subtract efficiently.



$$\begin{array}{r} {}^{4}\cancel{6}^{1}\cancel{5}2 \\ -\ 207 \\ \hline 445 \\ \hline \end{array}$$



$$\begin{array}{r} {}^{3}\cancel{4}^{1}357 \\ -\ 2735 \\ \hline 1622 \\ \hline \end{array}$$

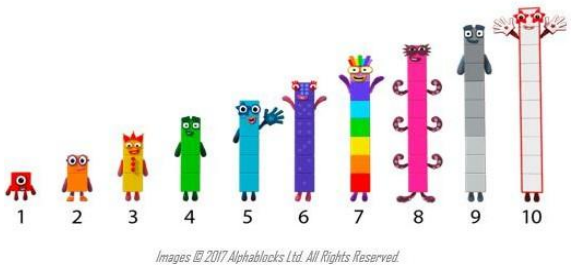
Addition and Subtraction

Year 1

Compose and Partition Numbers to 10 (1)

Vocabulary:

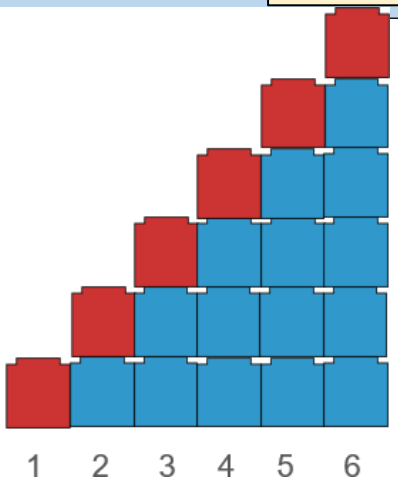
Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Numberblocks Part-Part-Whole (Cherry) model Tens Frame Fingers Five and-a-bit
Systematic Subitise One more One less



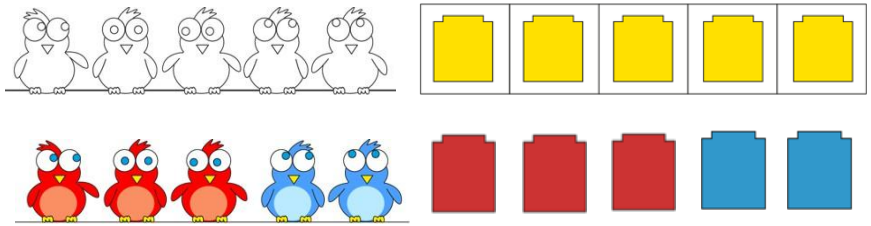
Images © 2017 Alphablocks Ltd. All Rights Reserved

Understand that numbers to 10 can be represented in many different ways.

Numbers to 5 can be identified without counting (subitising).



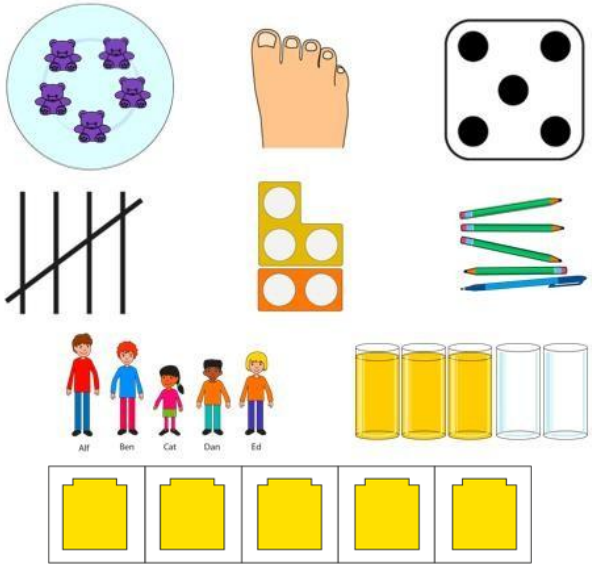
Each number is composed of the previous number and one more.



Each number can be partitioned into two smaller numbers

There are 5 ___. 3 are ___. 2 are ___.

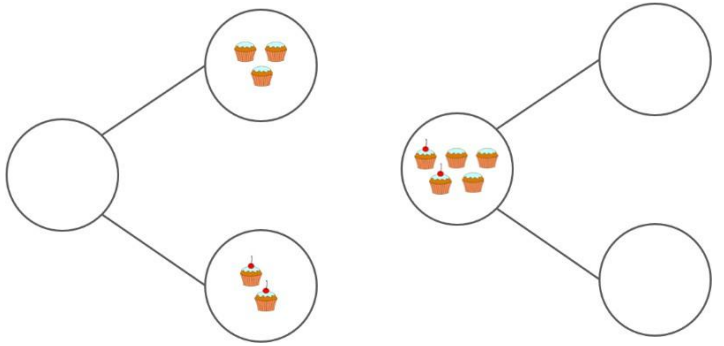
5 is the whole. 3 is a part. 2 is a part.

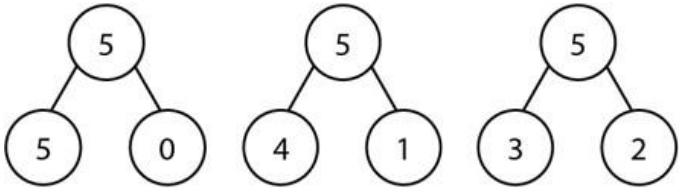


A number can be partitioned in different ways.

There are 5 ___. 3 are ___. 2 are ___.

5 is the whole. 3 is a part. 2 is a part.





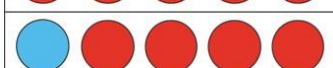
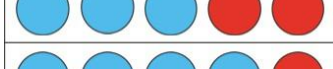
Addition and Subtraction

Year 1

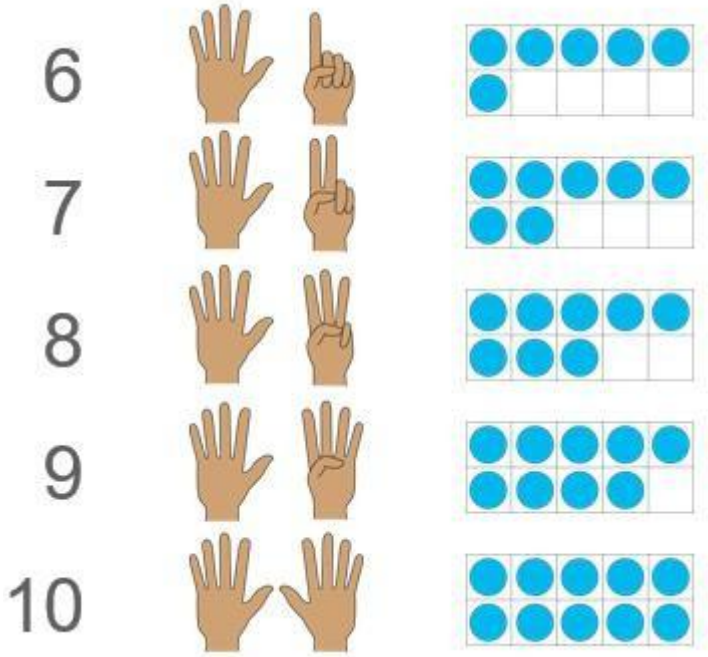
Compose and Partition Numbers to 10 (2)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten Represents Compose Combine Partition Numberblocks Part-Part-Whole (Cherry) model Tens Frame Fingers Five and-a-bit Systematic Subitise One more One less

	Blue	Red
	0	5
	1	4
	2	3
	3	2
	4	1
	5	0

A number can be partitioned in different ways



Numbers from 6 – 10 are composed of the

Addition and Subtraction

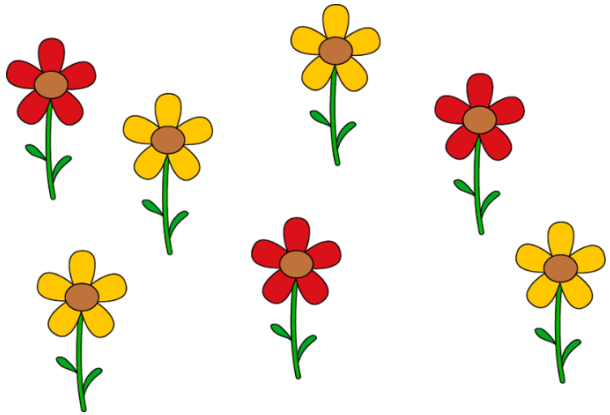
Year 1

Read, Write and Interpret Additive Equations (1)

Vocabulary:

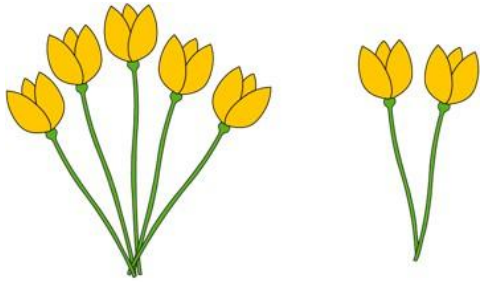
Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry)
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus − Equal
Addition Subtraction Increase Decrease First, Then, Now
Expression Equation

Addend + Addend = Sum Minuend − Subtrahend = Difference



Identify what each number represents in an expression.

The 4 represents the 4 yellow flowers. The 3 represents the 3 red



Identify what each number represents in an expression.

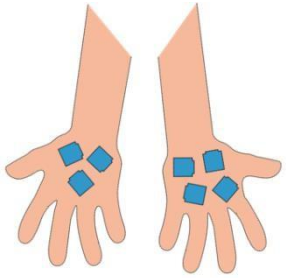
5 + 2 = 7

We can write 5 plus 2 is equal to 7.

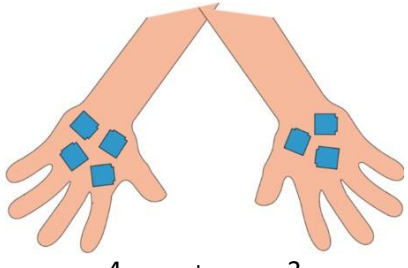
The 5 represents ____.

The 2 represents____.

The 7 represents the total number of ___.



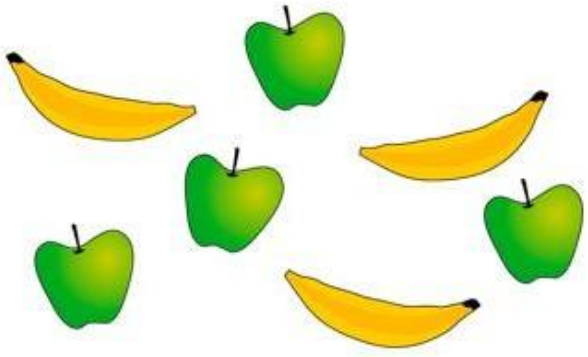
3 + 4



4 + 3

We can write the addends in either order.

(Commutative Law)



Addition and Subtraction

Year 1

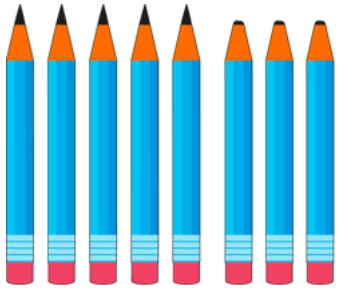
Read, Write and Interpret Additive Equations (2)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model Tens Frame Fingers Five and-a-bit Systematic Plus + Minus − Equal to = Addition Subtraction Quantity Increase Decrease First, Then, Now Expression Equation

Addend + Addend = Sum

Minuend − Subtrahend = Difference



Subtraction can tell us about partitioning.

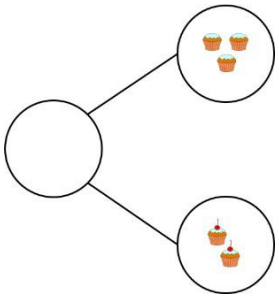
There are 8 ___ altogether.

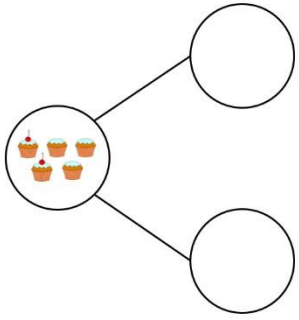
5 ___ are ___.

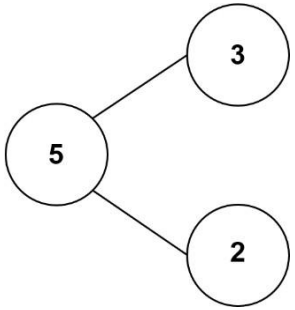
3 ___ are ___.

We can write this as 8 minus 5 is equal to 3.

8 − 5 = 3







Make connections between addition and subtraction using the part-part-whole model.

Addition can tell us about combining objects.

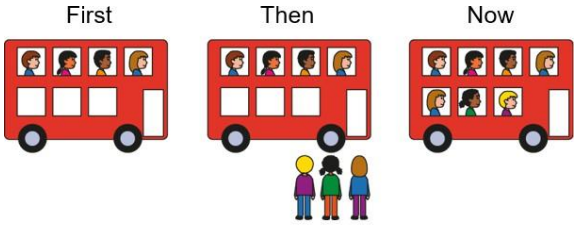
Subtraction can tell us about partitioning

$2 + 3 = 5$

$3 + 2 = 5$

$5 - 3 = 2$

$5 - 2 = 3$



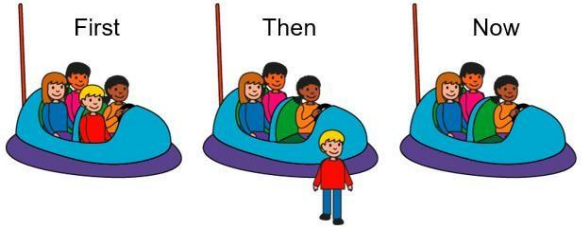
4 + 3 7

4 + 3 = 7

Understand the First, Then, Now structure of addition and subtraction.

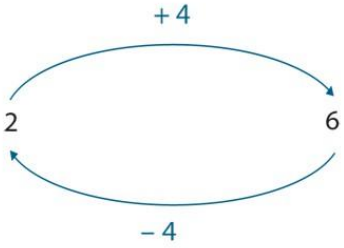
Addition can tell us about a quantity increasing.

Subtraction can tell us about a quantity decreasing.



4 − 1 3

4 − 1 = 3



Addition and Subtraction undo each other.

Addition and Subtraction

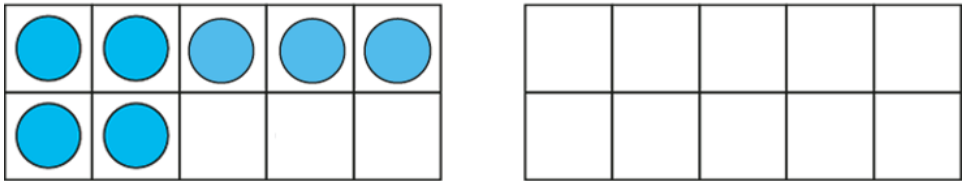
Year 2

Add and Subtract across 10 (1)

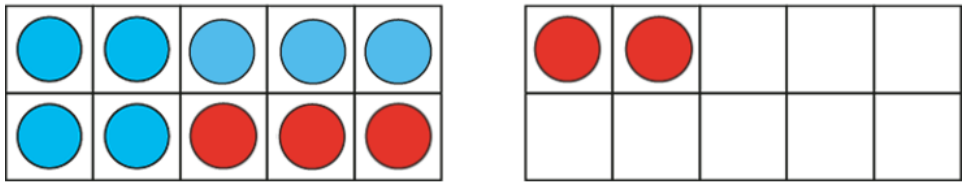
Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus −
Equal to = Addition Subtraction Quantity Increase Decrease First, Then,
Now Expression Equation

Addend + Addend = Sum Minuend − Subtrahend = Difference



7 + 5



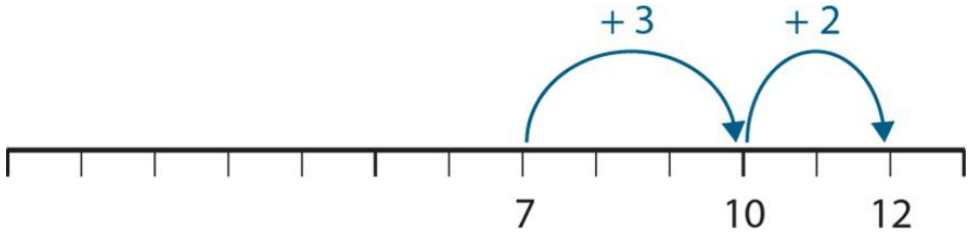
7 + 5 = 7 + 3 + 2 = 10 + 2

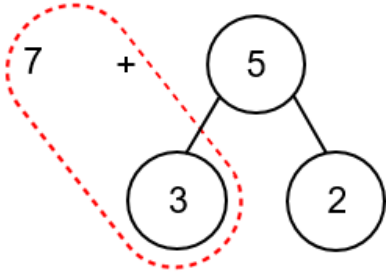
Use knowledge of known facts to bridge 10 using a 'make 10' strategy.

First, I partition the _ into ___ and ___.

Then, I add ___ and ___ to make 10.

Then, I add the remaining ___ to make ___.





7 + 3 = 10

10 + 2 = 12

Addition and Subtraction

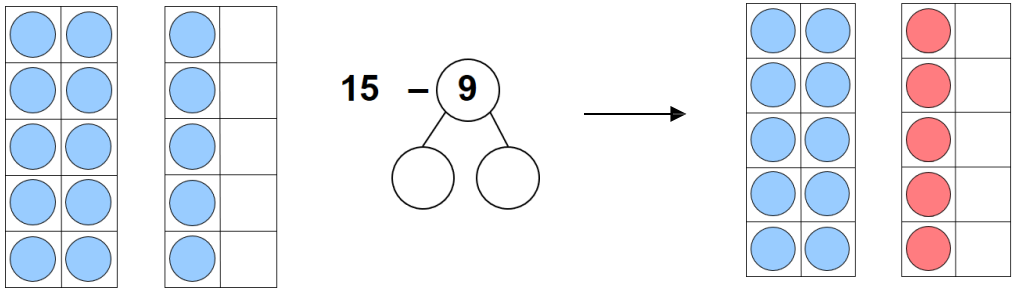
Year 2

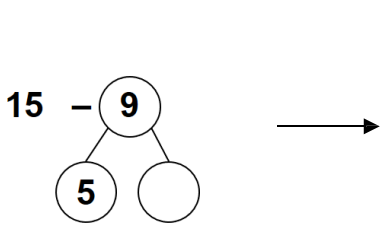
Add and Subtract across 10 (2)

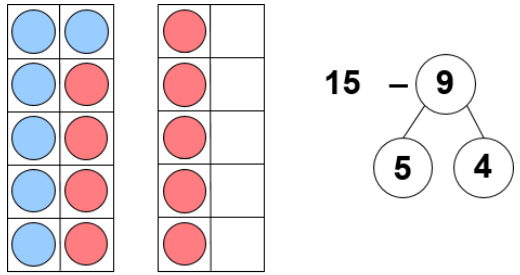
Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus -
Equal to = Addition Subtraction Quantity Increase Decrease
First, Then, Now Expression Equation

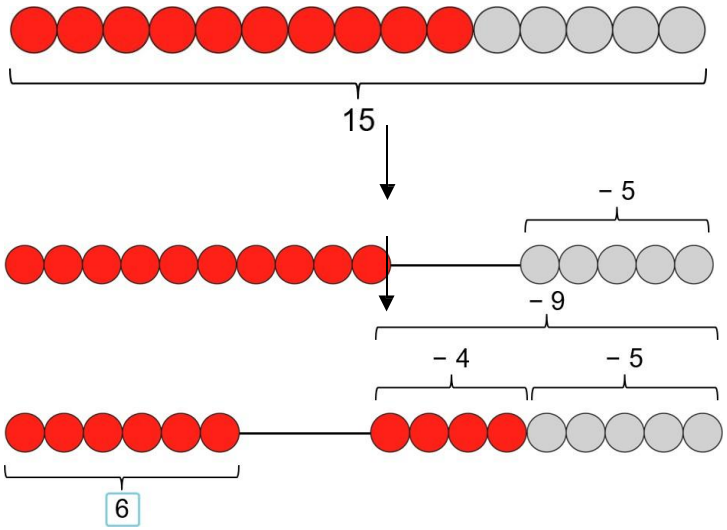
Addend + Addend = Sum Minuend - Subtrahend = Difference







15 – 9 = 6

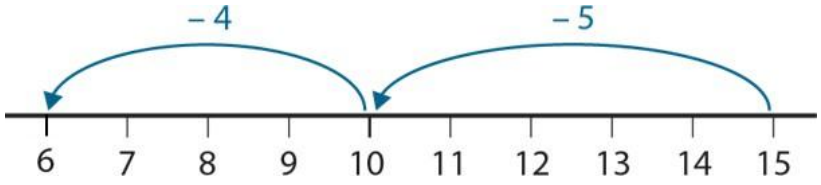


Use knowledge of known facts to subtract through 10. We can partition the subtrahend to help us subtract.

First, I partition the _____ into _____

_____ and ___. Then, I

subtract _____ and ___ to get to 10.



Addition and Subtraction

Year 2

Add and Subtract across 10 (3)

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus -
Equal to = Addition Subtraction Quantity Increase Decrease
First, Then, Now Expression Equation

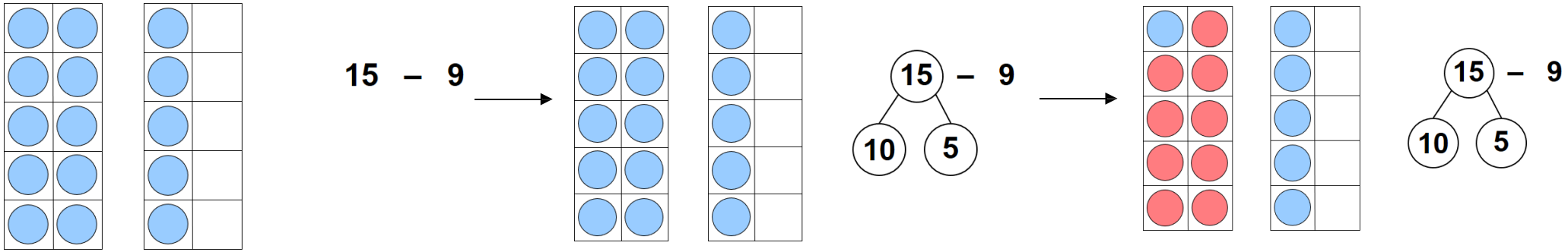
Addend + Addend = Sum Minuend - Subtrahend = Difference

Use knowledge of known facts to subtract *from 10*. We can partition the subtrahend to help us subtract.

First, I partition the __ into ___ and ___.

Then, I subtract __ from 10 to make ___.

Then, I add the remaining __ to make ___.



10 – 9 = 1

1 + 5 = 6

15 – 9 = 6

Addition and Subtraction

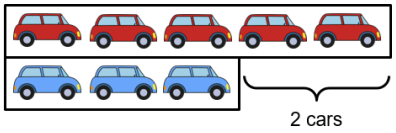
Year 2

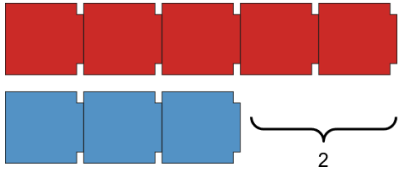
Solve Comparative Addition and Difference Problems

Vocabulary:

Part Whole One Two Three Four Five Six Seven Eight Nine Ten
Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model
Tens Frame Fingers Five and-a-bit Systematic Plus + Minus –
Equal to = Addition Subtraction Quantity Increase Decrease First, Then,
Now Expression Equation Difference Bar model

Addend + Addend = Sum Minuend – Subtrahend = Difference





Line up sets of objects in a bar model structure to support comparison.

There are 2 fewer blue cars than red cars.

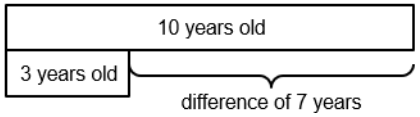
There are 2 more red cars that blue cars.



Ben is 10 years old



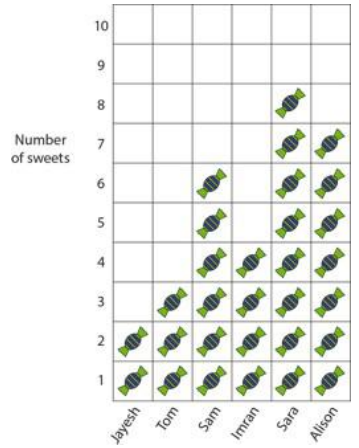
Charlotte is 3 years old



Represent a range of comparison contexts.

Ben is 7 years older than Charlotte.

Charlotte is 7 years younger than Ben.

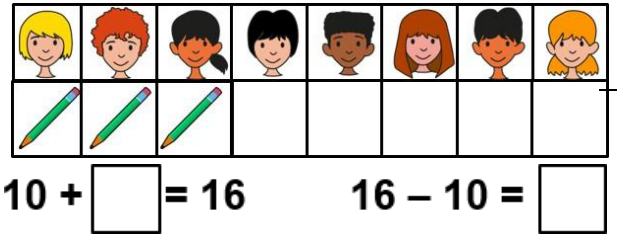


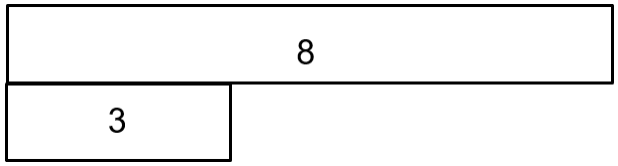
We can use subtraction to help solve difference problems / missing addend problems about 'how many more?' and 'how many fewer?'

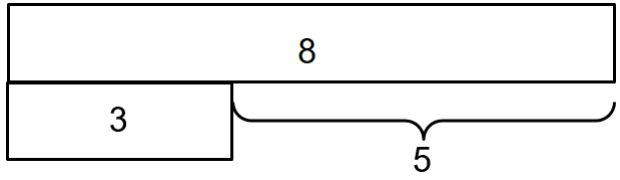
3 + __ = 8

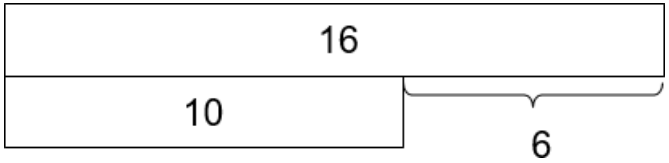
8 – 3 = 5

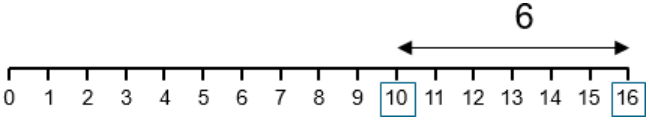
Create contexts for recognising the difference/comparative addition structure with all representations below.











Addition and Subtraction

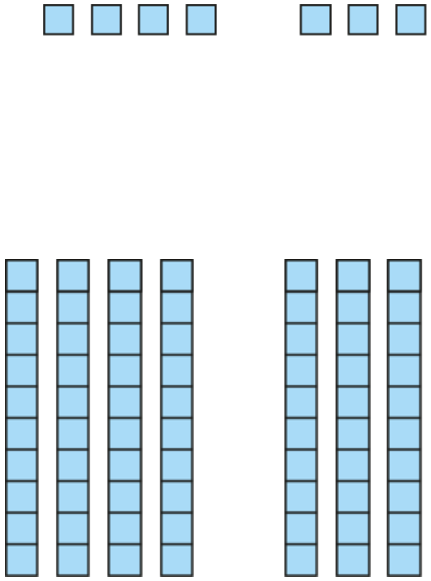
Year 2

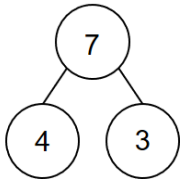
Add and Subtract within 100 (1).

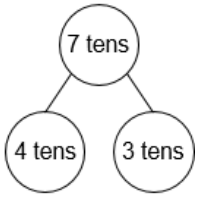
Vocabulary:

Part Whole Ones Tens Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model Tens Frame Deines Plus + Minus – Equal to = AdditionSubtraction Expression Equation Exchange Count on Count back Number line Tens Boundary

Addend + Addend = Sum Minuend – Subtrahend = Difference







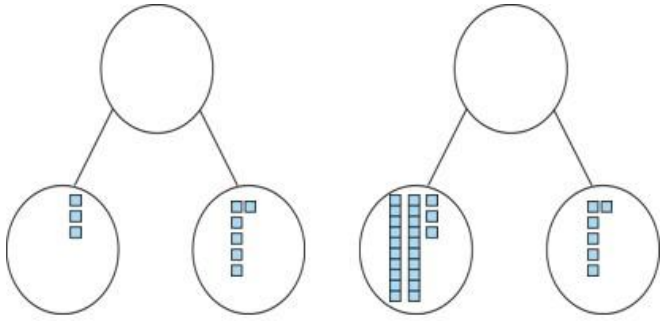
Use known facts within 10 to add/subtract multiples of 10.

I know that 4 plus 3 is equal to 7.

So, 4 tens plus 3 tens is equal to 7 tens.

40 + 30 = 70.

70 – 40 = 30

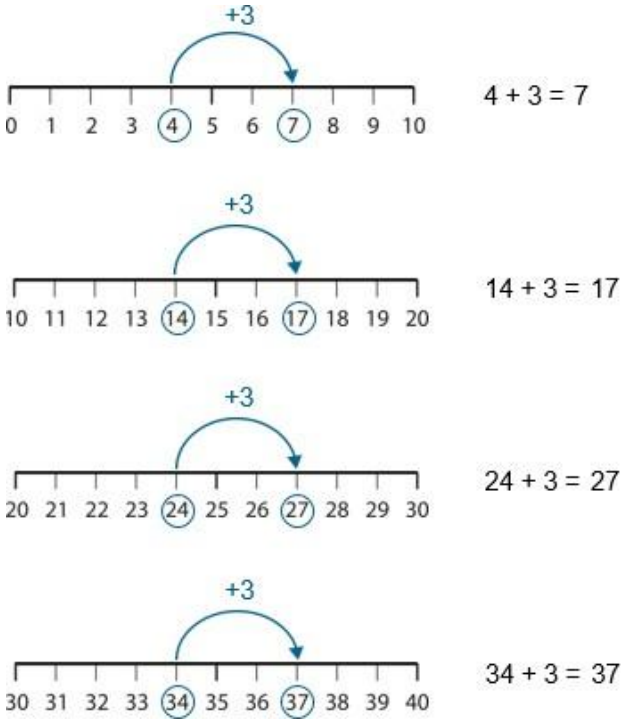


Use known facts within 10 to add/subtract ones to/from a 2 digit number.

I know that 3 plus 6 is equal to 9.

So, 2 tens and 3 ones plus 6 ones is equal to 2 tens and 9 ones.

23 + 6 = 29.



Generalise that adding/subtracting within 10 can be applied to adding a 2 digit number with a 1 digit number – not crossing the tens boundary.

I know that 4 plus 3 is equal to 7.

So, 1 ten and 4 ones plus 3 ones is equal to 1 tens and 7 ones.

14 + 3 = 17.

Addition and Subtraction

Year 2

Add and Subtract within 100 (2).

Vocabulary:

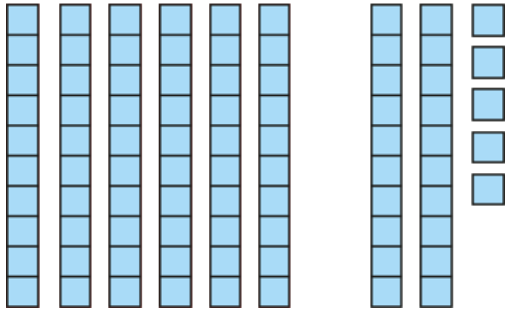
Part Whole Ones Tens Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model Tens Frame Deines Plus + Minus - Equal to = Addition Subtraction Expression Equation Exchange Count on Count back Number line Tens Boundary

Addend + Addend = Sum

Minuend – Subtrahend = Difference

6 + 2 = 8

60 + 25 = ?



Use known facts within 10 to add/subtract multiples of 10 to a 2 digit number.

I know that 6 plus 2 is equal to 8.

So, 6 tens plus 2 tens is equal to 8 tens. Then add the additional 5 ones.

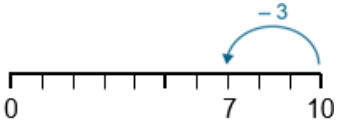
60 + 25 = 85.

Use knowledge of subtracting from 10 to subtract a single-digit number from a multiple of 10.

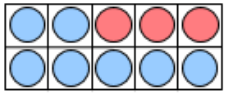
I know that 10 minus 3 is equal to 7.

So, 3 tens minus 3 ones is equal to 2 tens and 7 ones.

30 - 3 = 27.

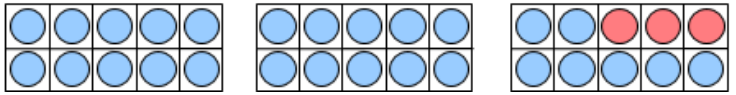


10 – 3





30 – 3



Addition and Subtraction

Year 2

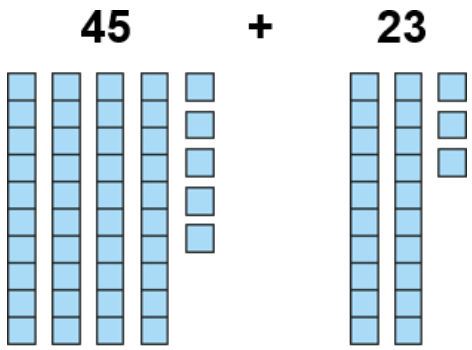
Add and Subtract within 100 (3).

Vocabulary:

Part Whole Ones Tens Represents Compose Combine Partition Total Part-Part-Whole (Cherry) model Tens Frame Deines Plus + Minus - Equal to = Addition Subtraction Expression Equation Exchange Count on Count back Number line Tens Boundary

Addend + Addend = Sum

Minuend – Subtrahend = Difference

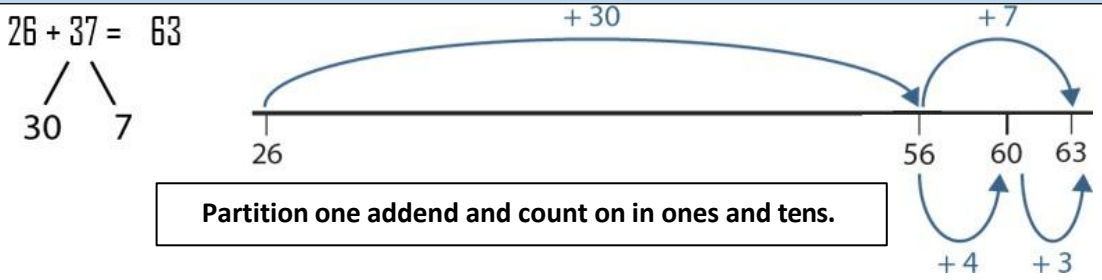


40 + 20 = 60

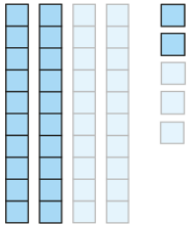
5 + 3 = 8

60 + 8 = 68

Partition both addends to add efficiently without crossing the tens boundary.



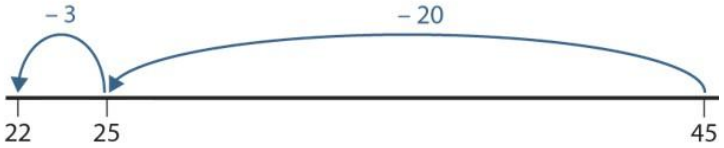
Partition one addend and count on in ones and tens.



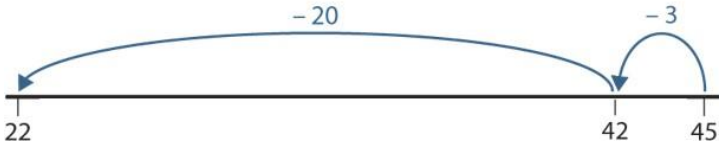
45 – 20 – 3

45 – 23 = 22

45 – 20 – 3 = 22

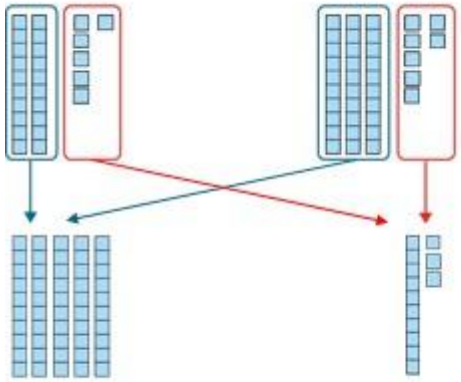


45 – 3 – 20 = 22



Subtract from any two-digit number by subtracting tens then ones without crossing a tens boundary.

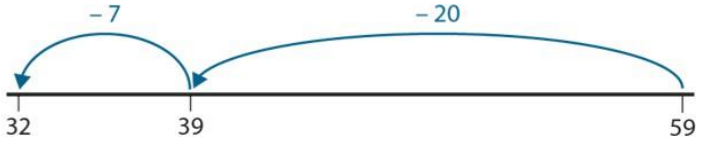
26 + 37 = 63



50 + 13 = 63

Partition both addends to add efficiently when the ones require an exchange.





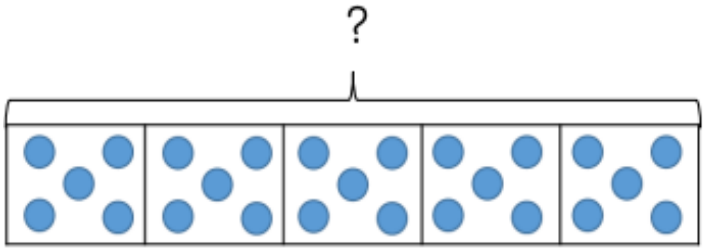
Subtract from any two-digit number by portioning the subtrahend into tens and ones and counting back.

Multiplication and Division

Bar Model

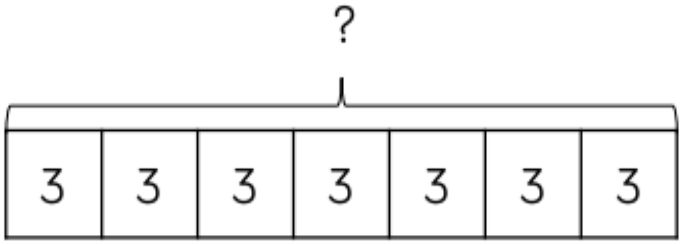
Benefits

Children can use the single bar model to represent multiplication as repeated addition. They could use counters, cubes or dots within the bar model to support calculation before moving on to placing digits into the bar model to represent the multiplication.



$5 \times 5 = 25$

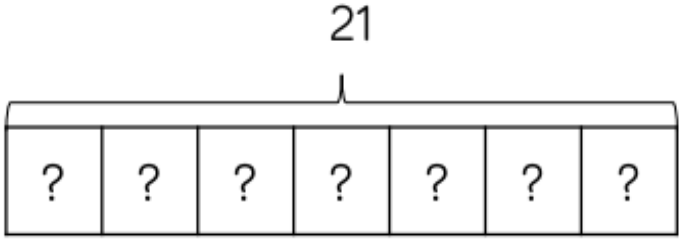
Division can be represented by showing the total of the bar model and then dividing the bar model into equal groups.



$3 \times 7 = 21$

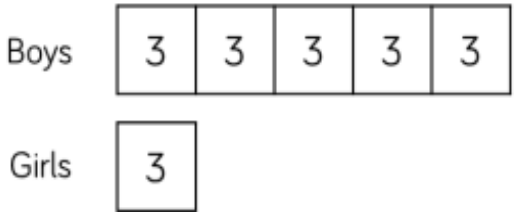
$7 \times 3 = 21$

It is important when solving word problems that the bar model represents the problem.



$21 \div 7 = 3$

Sometimes, children may look at scaling problems. In this case, more than one bar model is useful to represent this type of problem, eg There are 3 girls in a group. There are 5 times more boys than girls. How many boys are there?



The multiple bar model provides an opportunity to compare the groups.

Number Shapes

Benefits

Number shapes support children's understanding of multiplication as repeated addition.

Children can build multiplication in a row using the number shapes. When using odd numbers, encourage children to interlock the shapes so there are no gaps in the row. They can then use the tens number shapes along with other necessary shapes on the top of the row to check the total. Using the number shapes in multiplication can support children in discovering patterns of multiplication eg odd x odd
= even, odd x ever = odd, even x even = even.

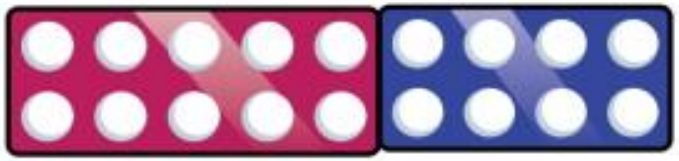
When dividing, the number shapes support children's understanding of division as grouping. Children make the number they are dividing and then place the number shapes they are dividing by over the top of the number to find how many groups of the number there are altogether. Eg There are 6 groups of 3 in 18.



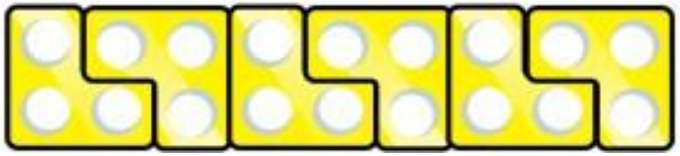
$5 \times 4 = 20$
$4 \times 5 = 20$



$5 \times 4 = 20$
$4 \times 5 = 20$



$18 \div 3 = 6$



Bead Strings

Benefits

Bead strings to 100 support children in their understanding of multiplication as repeated addition. Children can build the multiplication using the beads. The colour of beads supports children in seeing how many groups of 10 they have, to calculate the total more efficiently.

Encourage children to count in multiples as they build the number eg 4,8,12,16,20.

Children can also use the bead strings to count forwards and backwards in multiples, moving beads as they count.

When dividing, children build the number they are dividing and then group the beads into the number they are dividing by eg 20 divided by 4 - Make 20 and then group the beads into groups of 4. Count how many groups you have made to find the answer.
Ensure that children are articulating their counting correctly eg one group of 4, two groups of 4



$5 \times 3 = 15$
$3 \times 5 = 15$

$15 \div 3 = 5$



$5 \times 3 = 15$
$3 \times 5 = 15$

$15 \div 5 = 3$



$4 \times 5 = 20$
$5 \times 4 = 20$

$20 \div 4 = 5$

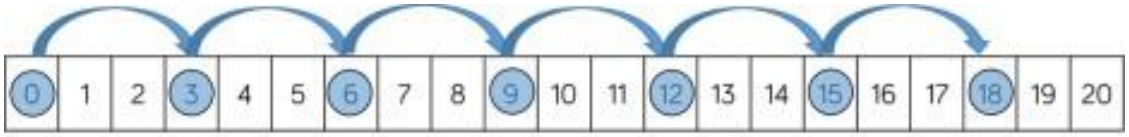
Number Tracks

Benefits

Number tracks support children to count in multiples forwards and backwards. Moving counters or cubes along the number track can support children to keep track of their counting. Translucent counters help children to see the number they have landed on whilst counting.

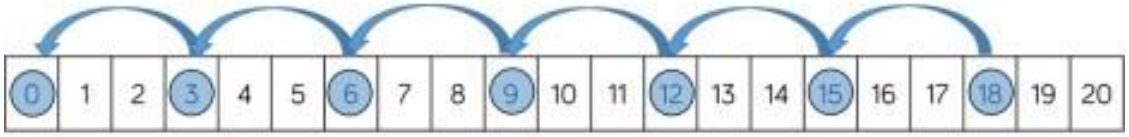
When multiplying, children place their counter on 0 to start and then count on to find the product of the numbers. When dividing, children place their counter on the number they are dividing and then count back in jumps of the number they are dividing by until they reach 0. Children record how many jumps they have made to find the answer to the division.

Number tracks can be useful with smaller multiples but when reaching larger numbers, they can become less efficient





$6 \times 3 = 18$
$3 \times 6 = 18$



$18 \div 3 = 6$

Number Lines (labelled)

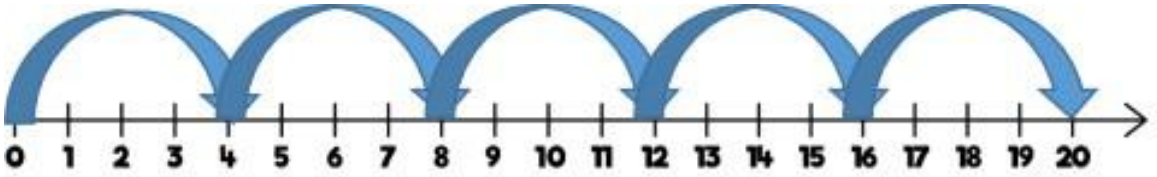
Benefits

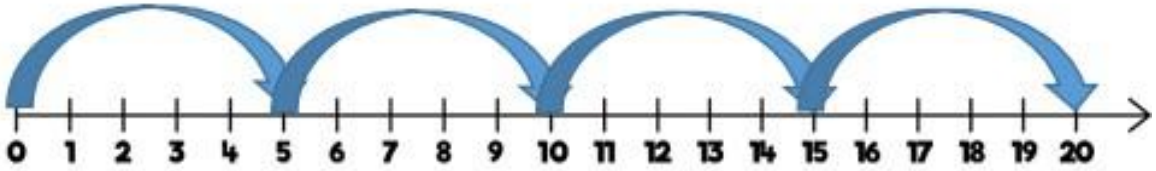
Labelled number lines are useful to support children to count in multiples, forwards and backwards as well as calculating single-digit multiplications.

When multiplying, children start at 0 and then count on to find the product of the numbers.

When dividing, start at the number they are dividing and then count back in jumps of the number they are dividing by until they reach 0. Children record how many jumps they have made to find the answer to the division.

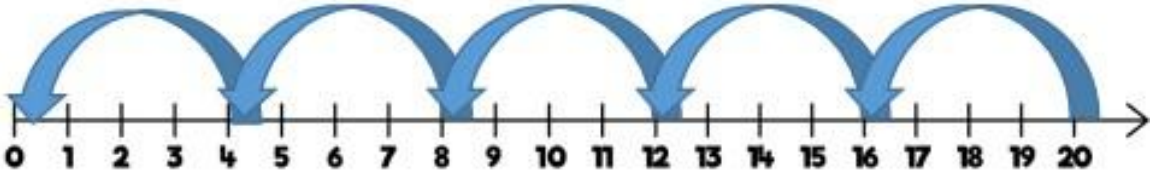
Labelled number lines can be useful with smaller multiples, however they become inefficient as number become larger due to the required size of the number line.





$4 \times 5 = 20$

$5 \times 4 = 20$



$20 \div 4 = 5$

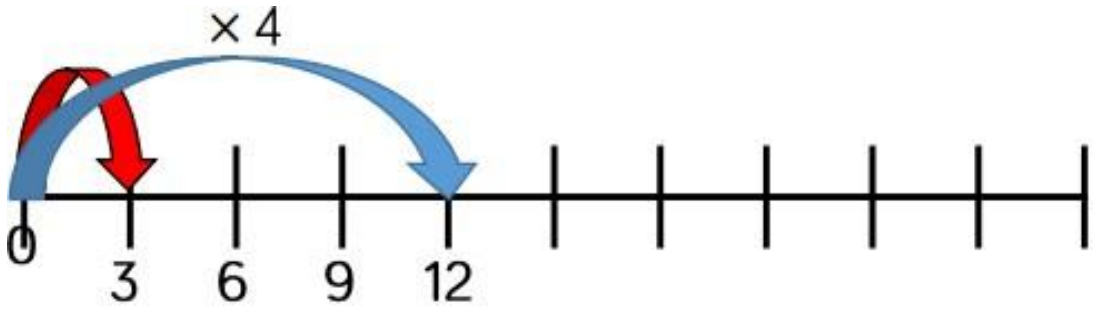
Number Lines (blank)

Benefits

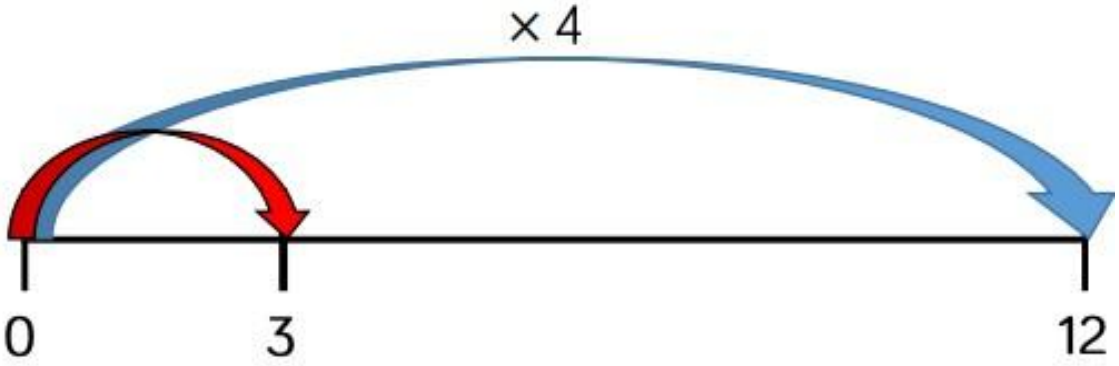
Children can use blank number lines to represent scaling as multiplication or division.

Blank number lines with interval can support children to represent scaling accurately. Children can label intervals with multiples to calculate scaling problems.

Blank number lines without intervals can also be used for children to represent scaling.



A red car travels 3 miles.
A blue car 4 times further.
How far does the blue car travel?



A blue car travels 12 miles.
A red car 4 times less.
How far does the red car travel?

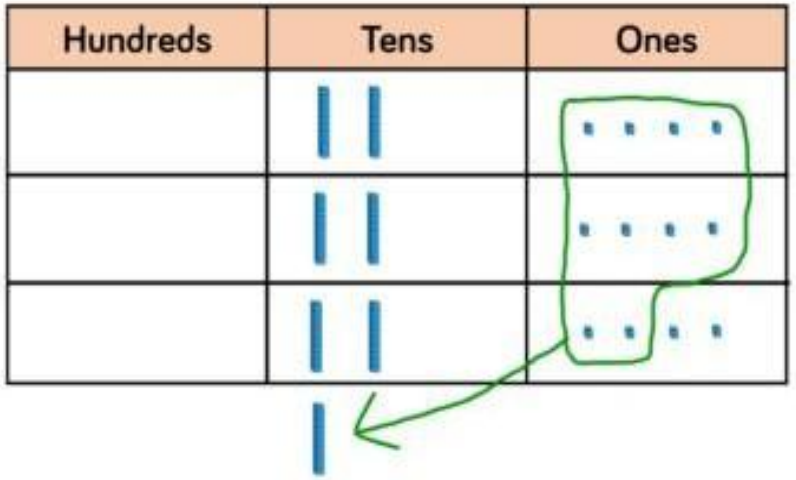
Base 10 /Dienes (multiplication)

Benefits

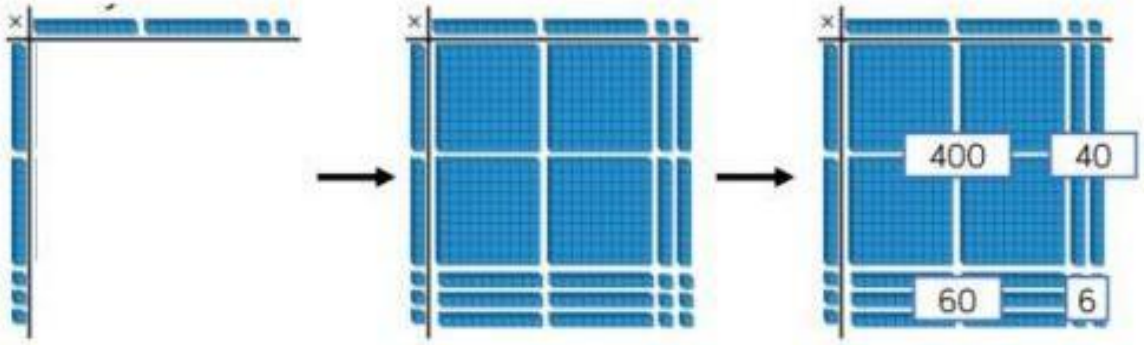
Using Base 10 or Dienes is an effective way to support children's understanding of column multiplication. It is important that children write out their calculation alongside the equipment so they can see how the concrete and written representations match.

As numbers become larger in multiplication or the amounts of groups become higher, Base 10 /dienes become less efficient due to the amount of equipment and number of exchanges needed.

Base 10 also supports the area model of multiplication well. Children use the equipment to build the number in a rectangular shape which they then fin the area of by calculating the total value of the pieces. This area model can be linked to the grid method or the formal column method of multiplying 2-digits by 2-digits.



$$\begin{array}{r} 24 \\ \times\ 3 \\ \hline 72 \\ \hline 1 \end{array}$$



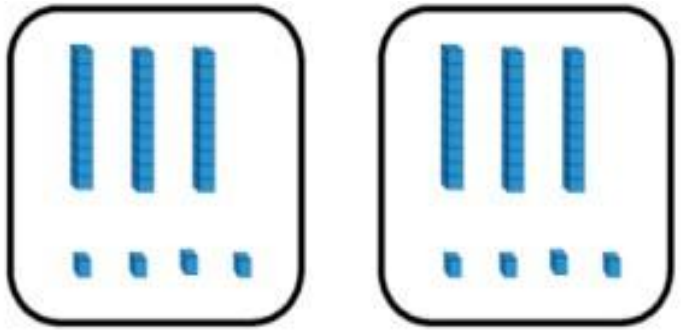
Base 10 /Dienes (division)

Benefits

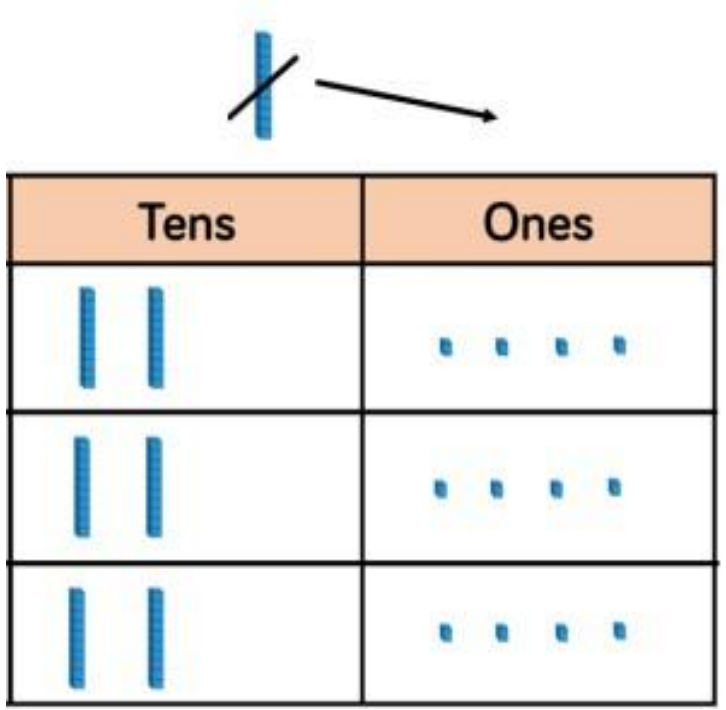
Using Base 10 or Dienes is an effective way to support children's understanding of division.

When numbers become larger, it can be an effective way to move children from representing numbers as ones towards representing them as tens and ones in order to divide. Children can then share the Base 10 between different groups eg by drawing circles or by rows on a place value grid.

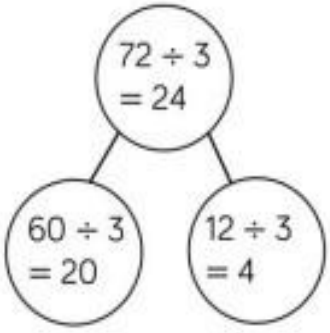
When they are sharing, children start with the larger place value and work from left to right. If there are any left in a column, they exchange eg one ten for ten ones. When recording, encourage children to use the part-whole model so they can consider how the number has been partitioned in order to divide. This will support them with mental methods.



$68 \div 2 = 34$



$72 \div 3 = 24$



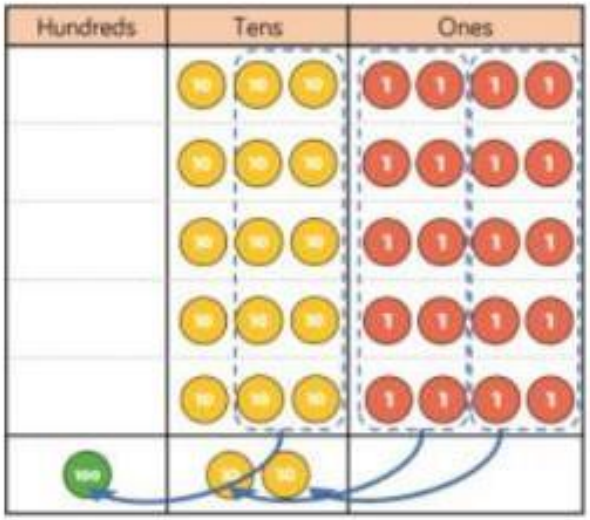
Place Value Counters (multiplication)

Benefits

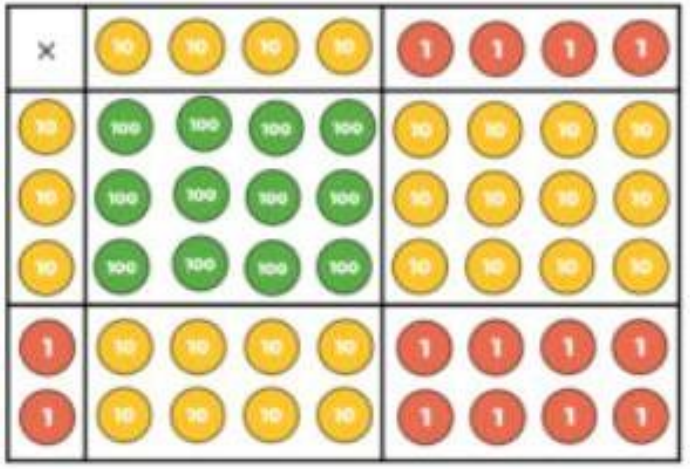
Using place value counters is an effective way to support children's understanding of column multiplication. It is important that children write out their calculation alongside the equipment so they can see how the concrete and written match.

As numbers become larger in multiplication or the amounts of groups becomes higher, Base 10 becomes less efficient due to the amount of equipment and number of exchanges needed. The counters should be used to support the understanding of the written method rather than support the arithmetic.

Place value counters also support the area model of multiplication well. Children can see how to multiply 2-digit numbers by 2-digit numbers.



$$\begin{array}{r} 34 \\ \times\ 5 \\ \hline 170 \\ \hline 1\ 2 \end{array}$$



$$\begin{array}{r} 44 \\ \times\ 32 \\ \hline 8 \\ 80 \\ 120 \\ +\ 1200 \\ \hline 1408 \\ \hline 1 \end{array}$$

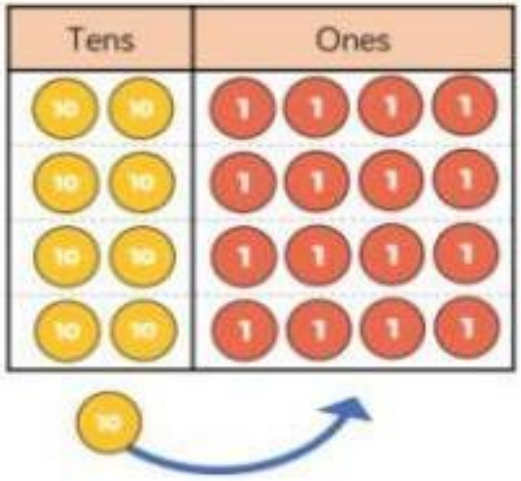
Base 10 /Dienes (division)

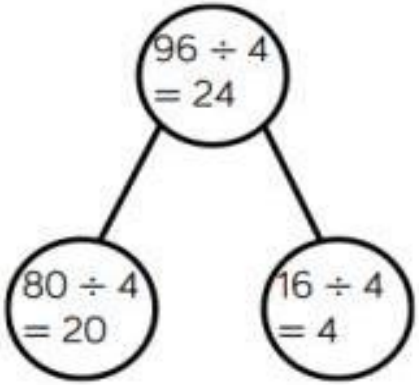
Benefits

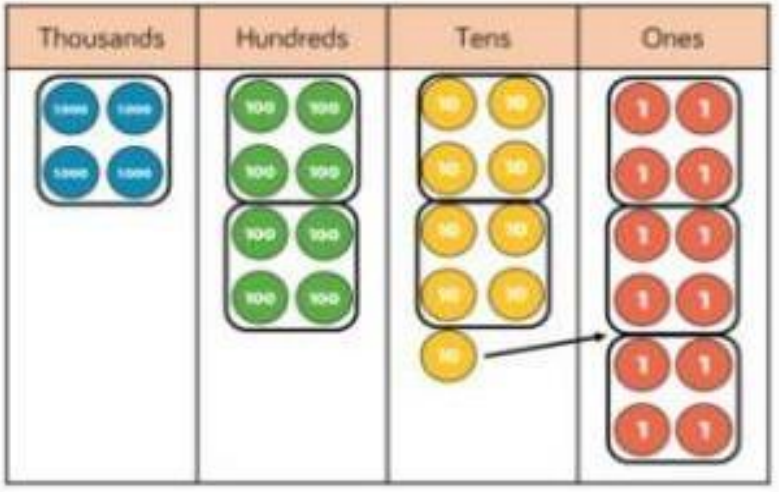
Using place value counters is an effective way to support children's understanding of division.

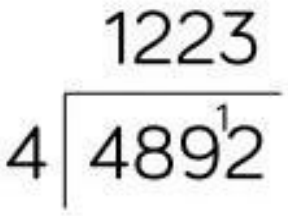
When working with smaller numbers, children can use place value counters to share between groups. They start by sharing the larger place value column and work from left to right. It there are any counters left over once they have been shared, they exchange the counter, eg exchange one ten for then ones. This method can be linked to the part-whole model to support children to show their thinking.

Place value counters also support children's understanding of short division by grouping the counters rather than sharing them. Children work from left to right through the place value columns and group the counters in the number they are dividing by. If there are any counters left over after they have been grouped, they exchange the counter eg exchange one hundred for ten tens.









Multiplication and Division

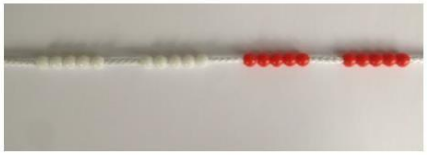
Year 1

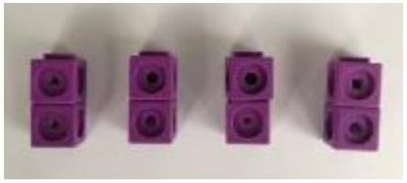
Multiplication as Repeated Addition

Vocabulary:

Group Equal Unequal Repeated Addition Multiplication Expression Equation Part Altogether Represents Amount Size

Times table focus:
X2, x5, x10



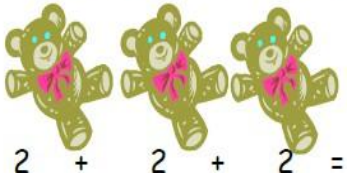


Giving children opportunities to count in equal groups of objects in 2s, 5s, 10s.



2 + 2 + 2 + 2 + 2 = 10

How many legs will 3 teddies have?



2 + 2 + 2 = 6



4 × 2 = 8

2 × 4 = 8



2 × 4 = 8

4 × 2 = 8

Using arrays to write multiplication sentences and reinforce repeated addition.

Using arrays in different rotations to find commutative multiplication sentences.



5 + 5 + 5 = 15

3 + 3 + 3 + 3 + 3 = 15

5 x 3 = 15

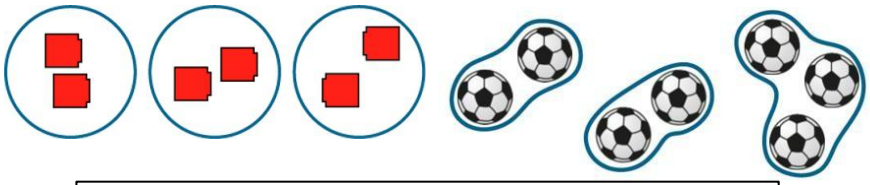
3 x 5 = 15

Multiplication and Division Year 2

Multiplication as Repeated Addition

Vocabulary:

Group Equal Unequal Repeated Addition Multiplication Expression Equation Part Altogether Represents Amount Size



Understand the difference between equal and unequal groups.

The ___have been grouped.



We can represent equal groups as repeated addition.

There are 3 groups of 5.

5 + 5 + 5

3 × 5

5 + 5 + 5 = 3 × 5

We can represent repeated addition using a multiplication expression.

The 3 represents the number of groups.

The 5 represents the number of eggs in each group.

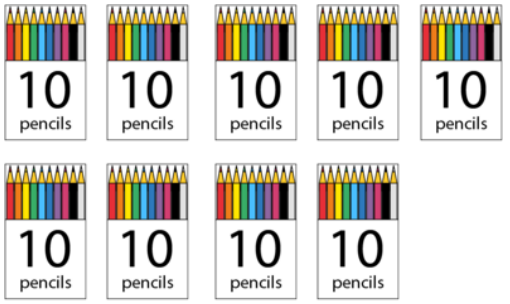
15 represents the total number of eggs.

The ___represents the number of groups.

The __represents the number of ___in each group.

___represents the total number of ___.

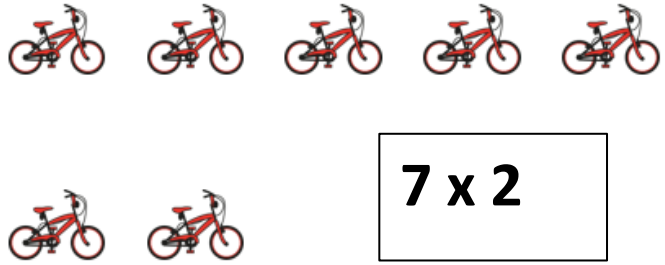
Notice how the representations allow the children to see each of the numbers (i.e. 10



9 × 10

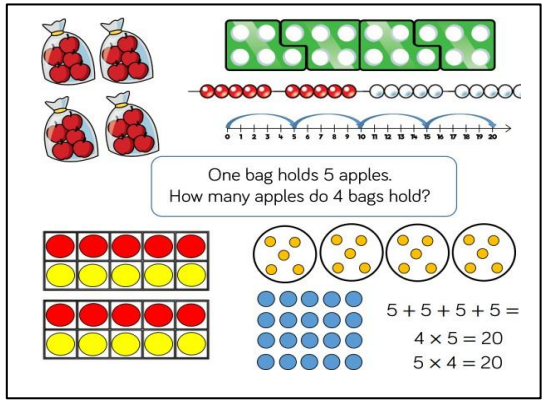
We can skip count in multiples of __to work out the total amount.

10, 20, 30, 40 … there are 90 pencils altogether.



7 x 2

Appropriate representations are selected to support the calculation.



Multiplication and Division Year 2

Grouping problems: missing factors and division

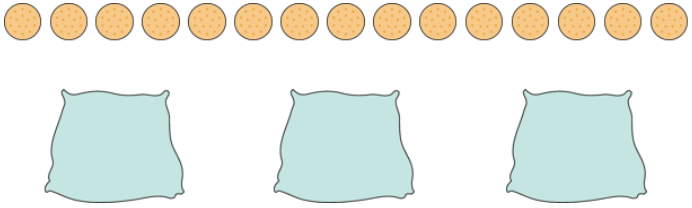
Vocabulary:

Multiplication Division Factor 'divided by' Represents Skip

Counting Multiplication facts Groups AmountSize

We can use ÷ to mean 'divided by'

We can use our knowledge of times tables to help solve division problems.



$\boxed{3} \times 5 = 15$

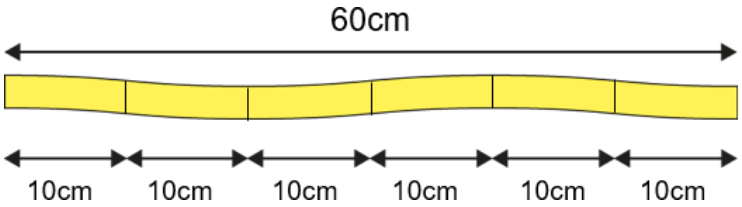
$15 \div 5 = \boxed{3}$

The 15 represents the number of biscuits.

The 5 represents the number of biscuits in each bag (group).

The 3 represents the number of bag (groups).

We can solve division problems by finding missing factors.



$\boxed{6} \times 10 = 60$

$60 \div 10 = \boxed{6}$

The 60cm represents the length of the ribbon.

The 10 represents the size of each piece.

The 6 represents the number of pieces we can make.

$45 \div 5 = \boxed{9}$

