Speen Church of England School
Mathematics Calculation Policy

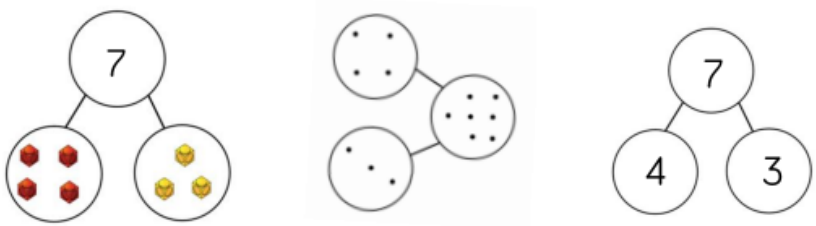
At Speen School, we use the White Rose Mathematics Scheme and resources in Key Stage 1 and the Power Maths Scheme in Reception. We follow the calculation policy guidance set out by White Rose and use appropriate resources models to build on children's calculation skills. This policy has two separate sections:

- addition and subtraction
- multiplication and division

At the beginning of each section has an overview of the different models and resources we use in order to support the teaching of the different mathematical concepts of calculation. We have broken down each operation into different skills and mapped them through preschool, Reception and Key Stage 1 and added in the models and resources into this section.

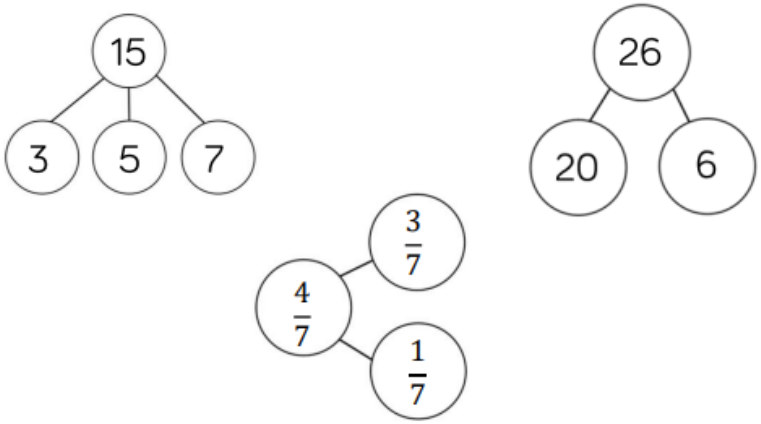
PART 1: Addition and Subtraction

Part Whole Model



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

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



We use the part whole model to support children in their understanding of addition, subtraction and partitioning.

When the parts are given, the children use addition in order to find the whole or the total.

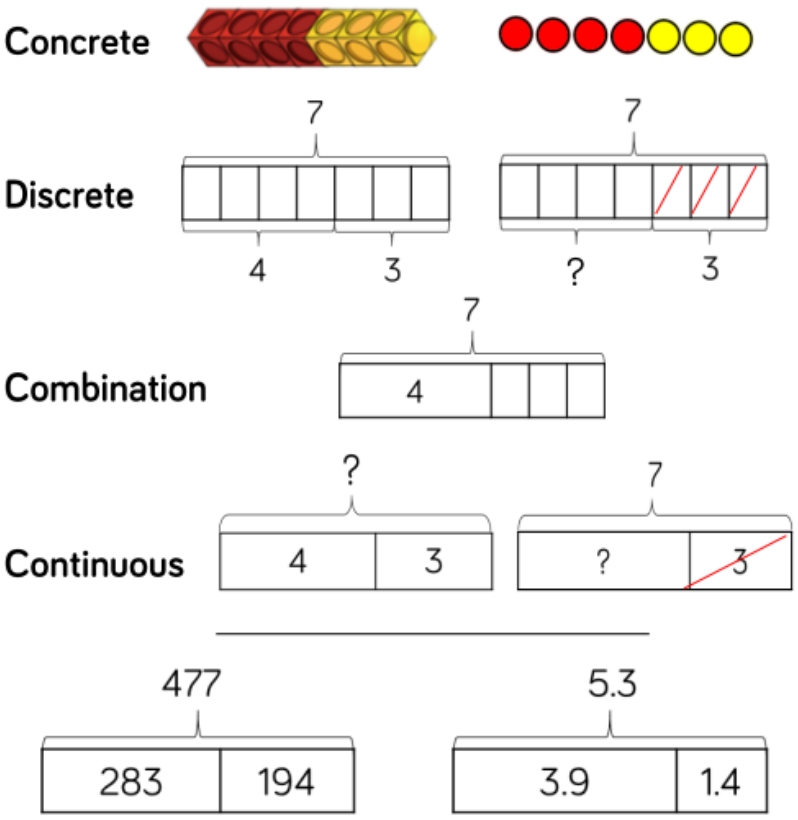
When the whole is given as well as one of the parts, the children use partitioning in order to find the other part. They find the difference between the whole and the other part.

The part whole model can be used to partition numbers into tens and ones but children also use this model to flexibly partition numbers e.g. 20 + 15 = 35

Part whole models can be used to partition a number into more than two parts.

Children continue to use this model in Key Stage 2 with larger numbers as well as different number representations such as fractions, decimals and percentages.

Bar Model (single)



The bar model is another type of part whole model and we use this model to support children in their understanding of addition and subtraction.

We use cubes as a concrete model and representation of addition and subtraction.

We use the discrete bar model to represent the concrete resources and in this model each section is representing one whole.

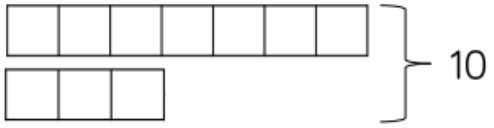
Once children can use and understand discrete bar models, we introduce a combination bar model that supports the concept of counting on from a given number.

The continuous bar model can be used for a range of values as each section can represent any number.

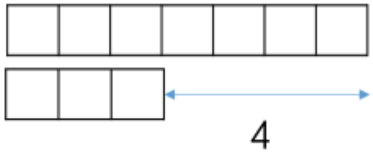
Children continue to use the continuous bar model in key stage 2 with a range of values.

Bar Model (multiple)	This multiple bar model supports children in their understanding of comparing quantities. We use the discrete multiple bar models as part whole models. We also use this model to show the concepts of difference in subtraction. The continuous multiple bar model is used for a range of larger number values. Children continue to use the continuous bar model in key stage 2 with a range of values.

Discrete

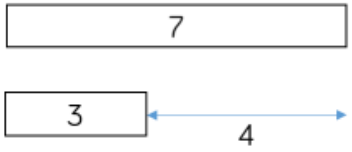


$7 + 3 = 10$

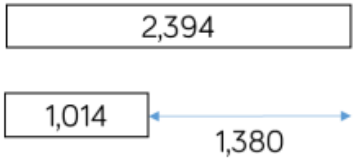


$7 - 3 = 4$

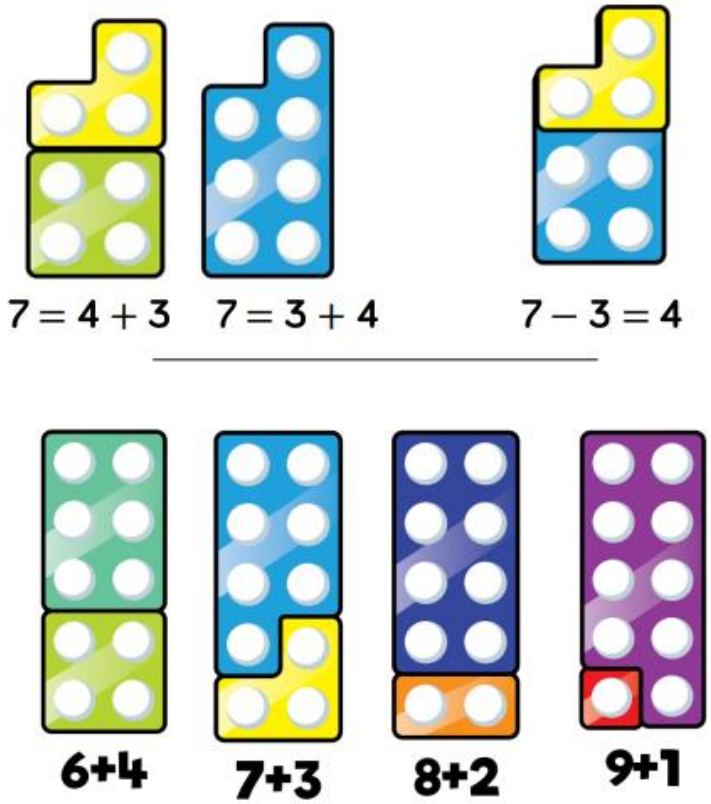
Continuous

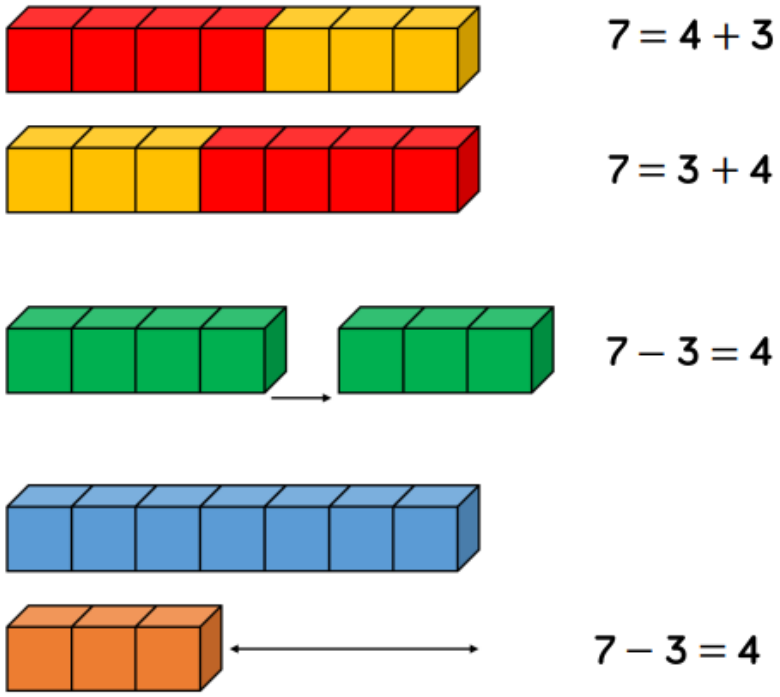


$7 - 3 = 4$

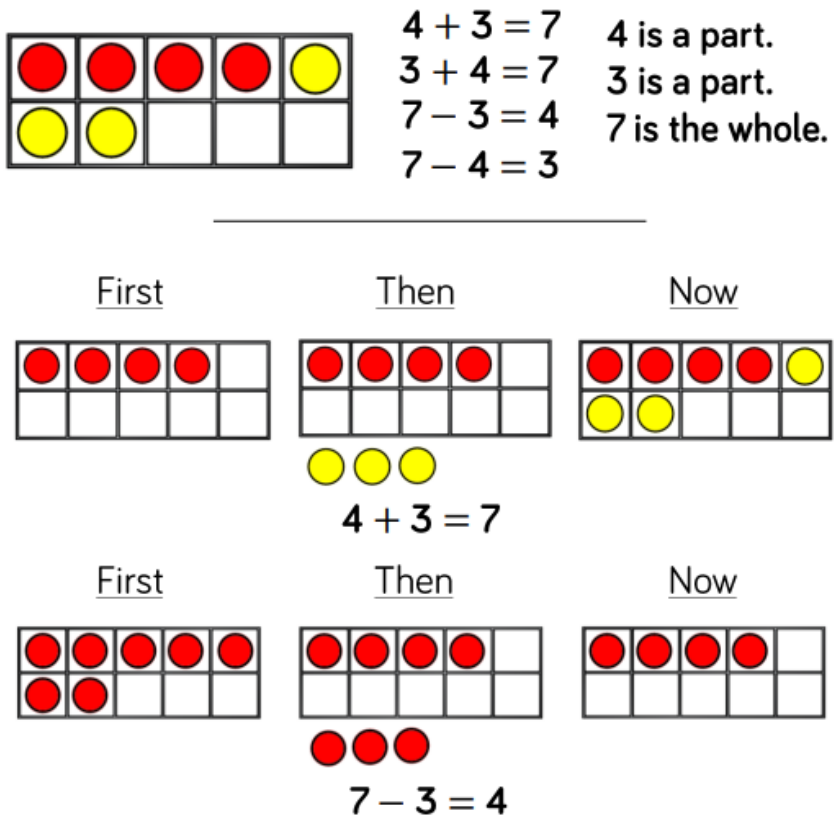


$2{,}394 - 1{,}014 = 1{,}380$

Numicon	
	We use nunicon number shapes to support children in their understanding of subitising, addition, partitioning and number bonds. When adding numbers, children can see how the parts come together to make the whole. They will become familiar with the number shapes and will recognise / subitise the whole. In the same way, when subtracting, once children place the part on top of the whole, they can instantly see the missing part. We use number shapes to explore umber bonds and finding all possibilities.

Cubes	
	We use cubes as concrete resources to support children in their addition and subtraction of one-digit numbers. When using two colours, children can see that addition can be done in any order. When subtracting, children start with the whole and remove some cubes. Cubes can also be used to represent the difference, by making two concrete cube bar models and counting the difference between the whole and the given part.

Ten Frames within 10



We use ten frames to teach different structures of addition and subtraction.

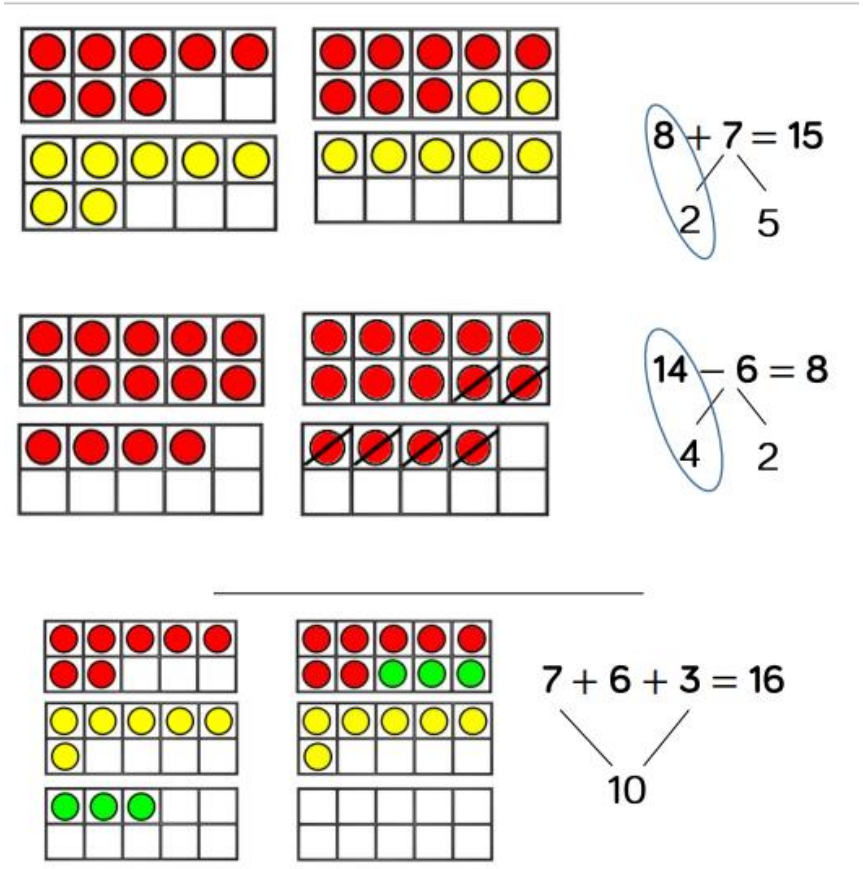
For addition, we use ten frames to combine different parts together within ten. This is aggregation. For example, four red counters plus 3 yellow counters altogether make 7 counters.

We also use ten frames to show augmentation i.e. increasing a number. For example, first there were 4 cars in the car park. Then 3 more cars arrived. Now there are 7 cars in the car park.

In the same way, partitioning the whole into parts can also be demonstrated using ten frames. This is a form of subtraction where the whole is split into parts.

We also use ten frames to show take away (decreasing a number). For example, there were 7 cars in the car park. Then 3 cars drove away. Now we have 4 cars in the car park.

Ten Frames within 20



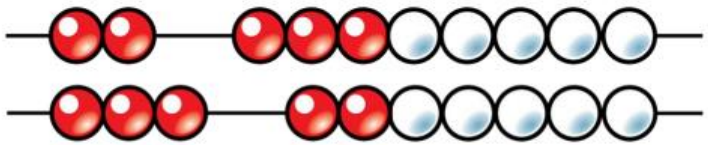
We use ten frames to teach children how to add two one-digit number.

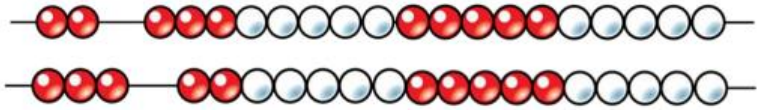
We make the two numbers on separate ten frames and then we move part of one number to make ten on one of the ten frames. This helps children to see how to add across ten by making ten and then add the remaining part.

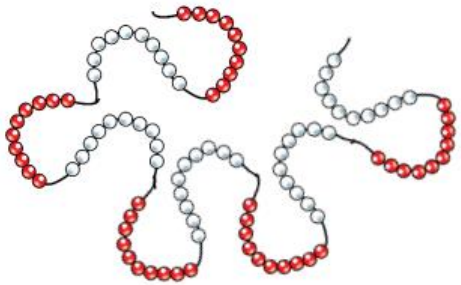
When subtracting make the larger number on a ten frame and take away the part paying attention to how they have partitioned the number to make ten.

These support effective mental maths methods when adding and subtracting across ten.

Bead strings	We use bead strings to support addition and subtraction. Bead strings to ten help children explore number bonds within 10. We use bead strings to one hundred to support children with exploring number bonds to 100. We also use these bead strings to support children when adding or subtracting by making ten e.g. 36 + 7 36 + 4 + 3 35 – 6 35 – 5 – 1 This supports mental addition and subtraction.

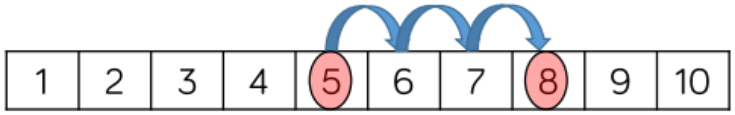




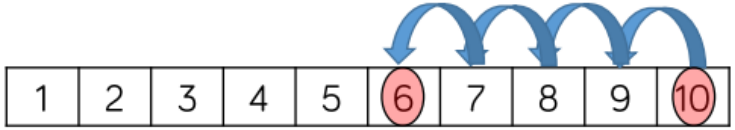


Number track	We use number tracks to support addition and subtraction - augmentation and reduction. When adding, children find the starting number and count on to find the total. When subtracting children start with the whole and find that on the number track and count back to find the difference between the numbers.

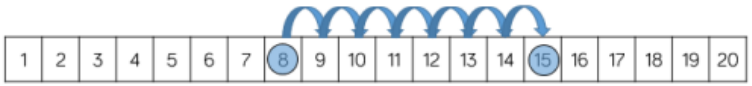
$5 + 3 = 8$



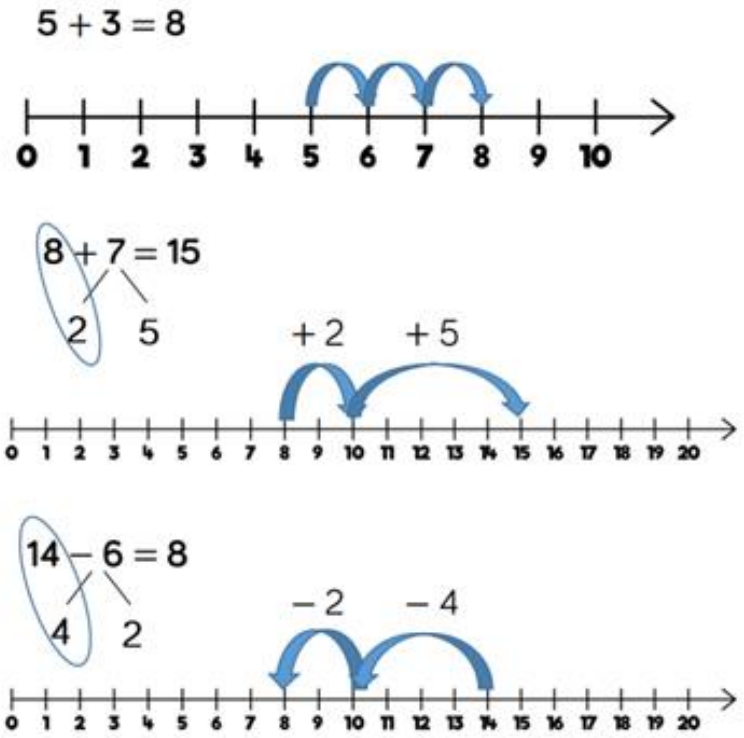
$10 - 4 = 6$



$8 + 7 = 15$

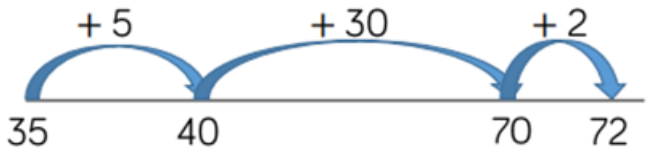


Number Lines (labelled)	We use labelled number lines to support addition and subtraction - augmentation and reduction. Children count on in ones up and down the number line which line with the use of number tracks. When bridging through ten, children can count up to ten and then add to the total. This links with making ten and using ten frames. Children partition the smaller number so that they can make a ten and add on the remaining part to get the total. When subtracting, children use number lines when bridging though ten. They start with the total and subtract by jumping back to the nearest ten and then subtracting the remaining part. Again, this links with making tens and using tens frames. Using ten frames alongside number lines when bridging through ten helps children to see how they can partition their numbers to help them calculate.

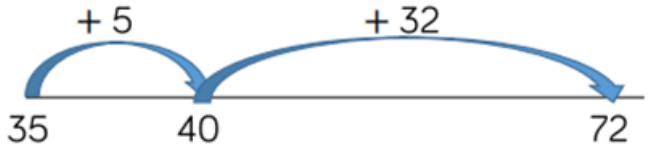


Number Lines (blank)	We use blank number lines to help children calculate with larger numbers (2-digit numbers) in smaller steps. When adding, children can jump to the nearest ten number and add the remaining part in smaller parts by adding the tens and ones separately or adding on the whole number e.g. 10 + 10 + 10 + 2; 30 + 2 or add 32. When subtracting, children follow the same strategies by counting back to the nearest ten and subtracting the remaining part in smaller steps or as a whole number.

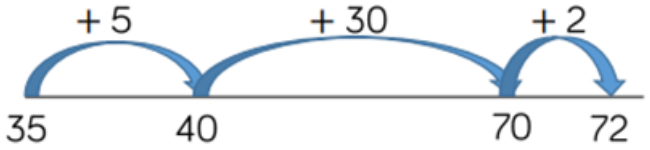
35 + 37 = 72

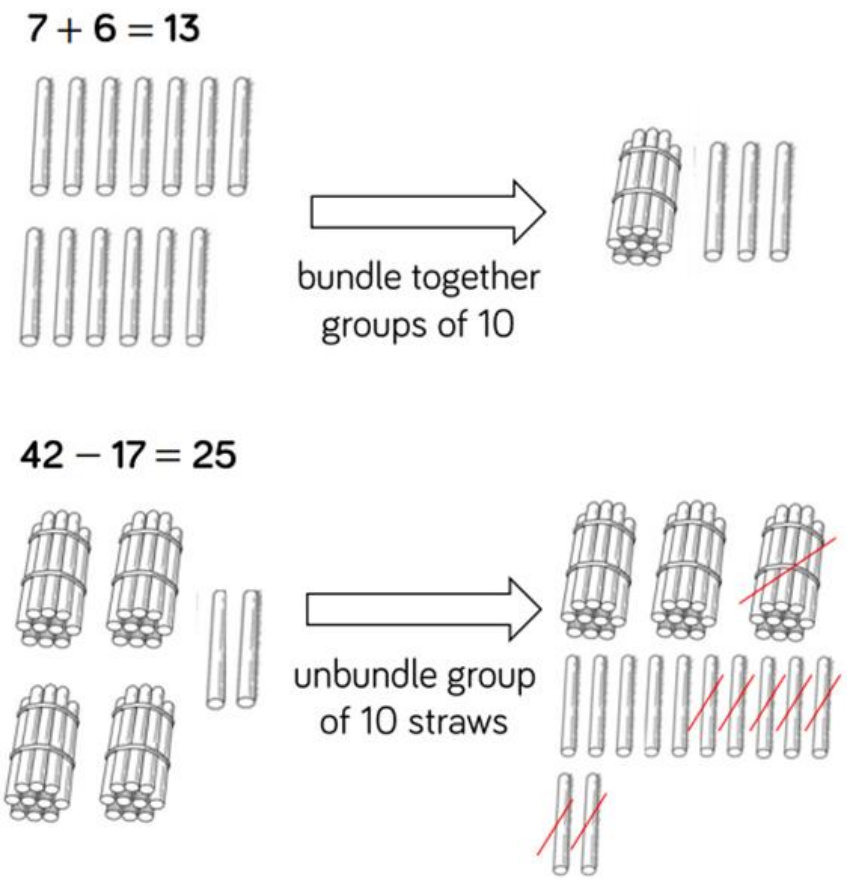


35 + 37 = 72

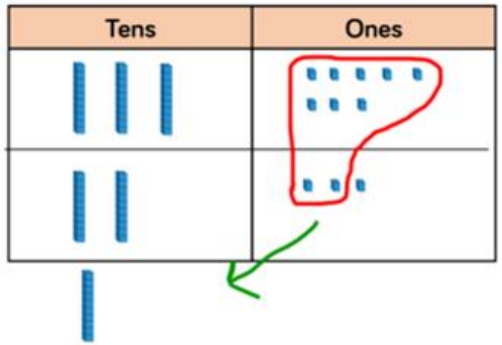


72 – 35 = 37

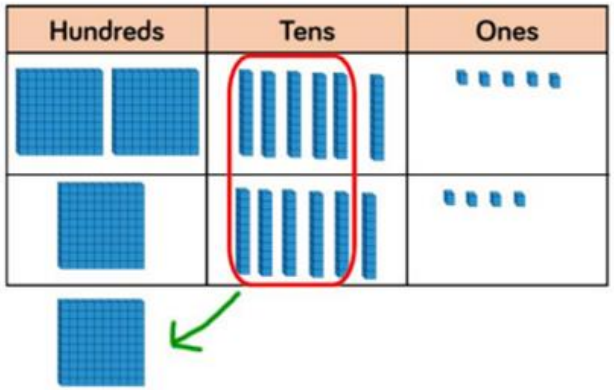


Straws	
	We use straws to help children understand exchanging when adding and subtracting 2-digit numbers. When adding two one-digit numbers together, we teach children to make a bundle of ten to help them find the total. When working with larger 2-digit numbers, we can use straws for addition and subtraction. For example when adding 44 + 17, we have 4 tens and 4 ones and one ten and 7 ones. Children bundle a group of ten straws together to make one ten and to represent the exchange from 10 ones into 1 10. In the same way, when subtracting 2-digit numbers, if the number of ones in the whole is fewer than the number of ones in the part we are subtracting, children unbundle one group of ten straws to make ten ones to represent the exchange from 1 ten to 10 ones.

Dienes / Base ten (addition)



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



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

We use Dienes or base ten to support children's understanding of column addition.
We ask children to use or draw Dienes alongside their written column addition to see the link between the method and the model.

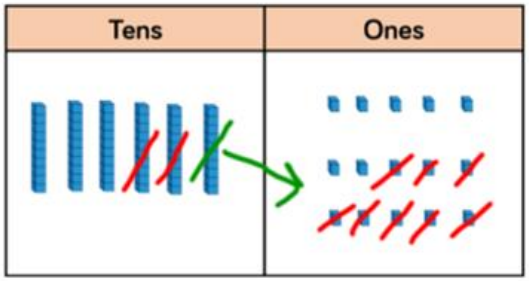
In addition, we teach children adding a 1-digit number to a 2-digit number, followed by adding two 2-digit numbers without any exchange before adding two 2-digit numbers involving exchanging ones to tens.

When using the column addition method, we always start with the smallest place value column.
There are a number of steps we follow to structure children's thinking.

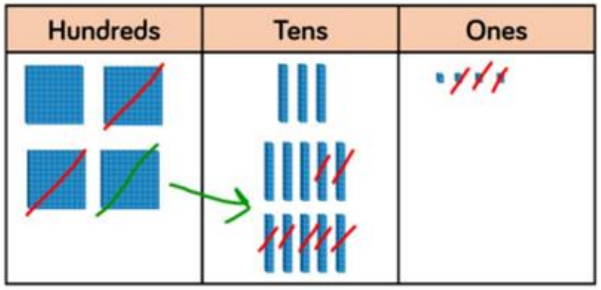
- How many ones are there altogether?
- Can we make an exchange? (Yes or No)
- What can we exchange? (Ones)
- How many do we exchange? (We exchange 10 ones for 1 ten and we record the 1 ten by writing 1 in the tens column.)
- How many ones do we have left? (We write the number of ones in the ones column.)

We repeat the process with the other column values in turn.

Dienes / Base ten (subtraction)



$$\begin{array}{r} {}^{5}\not{6}\,{}^{1}\not{5} \\ -\ 2\ 8 \\ \hline 3\ 7 \end{array}$$



$$\begin{array}{r} {}^{3}\not{4}\,{}^{1}\not{3}\,5 \\ -\ 2\ 7\ 3 \\ \hline 2\ 6\ 2 \end{array}$$

We use Dienes or base ten to support children's understanding of column subtraction. When building the Dienes model, we highlight that we only make the minuend and we subtract the subtrahend.

First, we teach subtracting a 1-digit number from a 2-digit number, followed by subtracting a 2-digit number from a 2-digit number. Finally, we teach subtracting a 2-digit number from a 2-digit number where exchange is required.

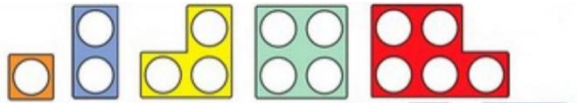
When using the column subtraction method, we always start with the smallest place value column. There are a number of steps we follow to structure children's thinking.

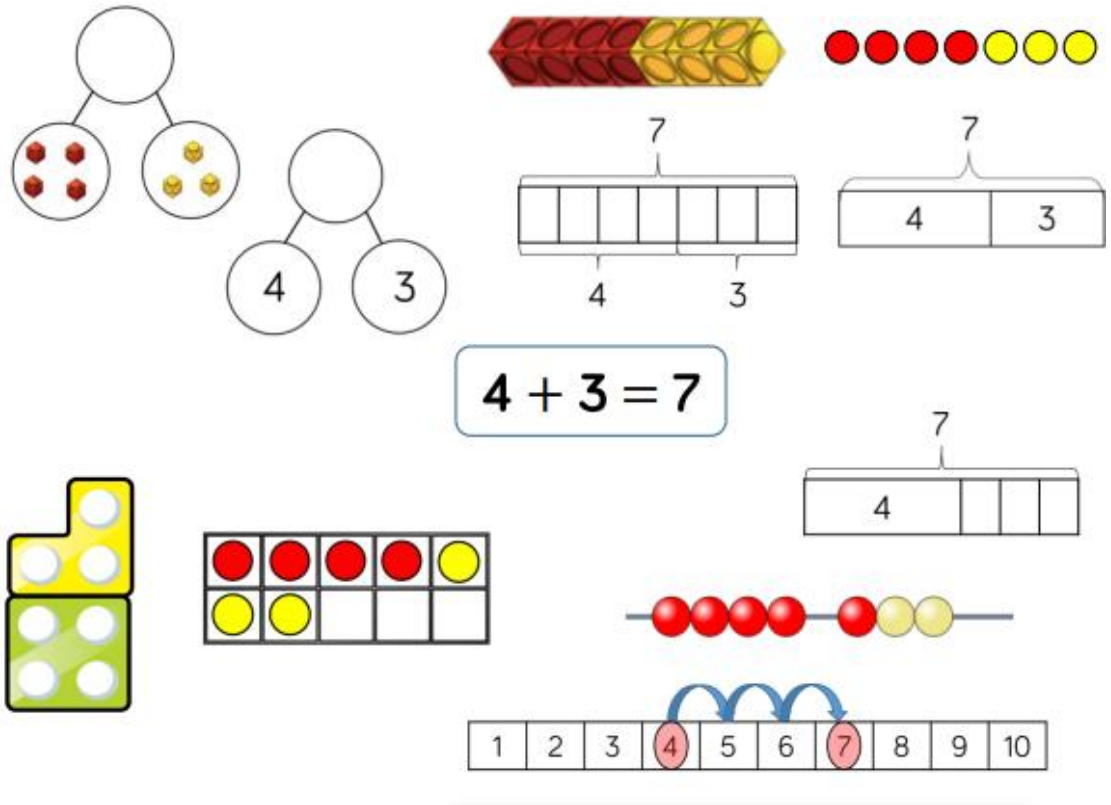
- How many ones do I need to subtract?
- Do we need to make an exchange? (Yes or No)
- What can we exchange? (Tens – we can exchange 1 ten and
- How many do we exchange? (We exchange 10 ones for 1 ten and we record this by putting a 1 ten above the ones column and crossing out the original number of tens and writing the remaining ten above the tens column to show the exchange.)
- Now we have enough ones in the ones, column, we can carry out the subtraction. How many ones are there left? (We write the number of ones left in the ones column.)

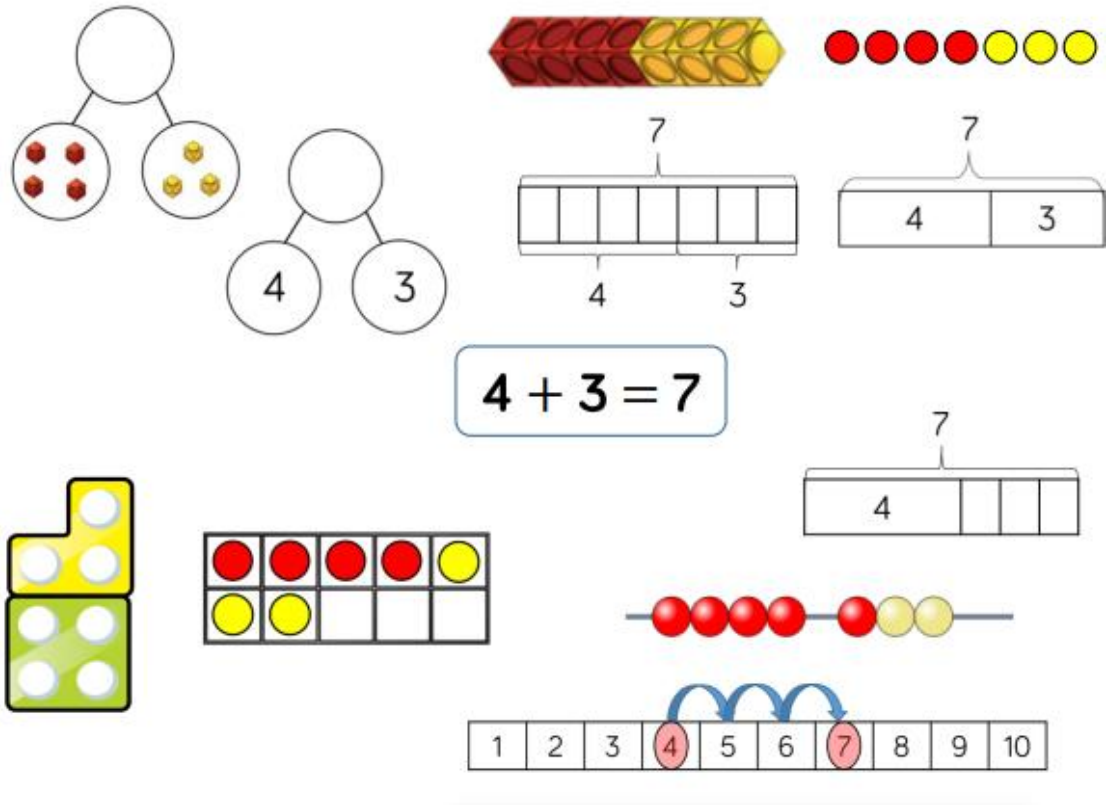
We repeat the process with the other column values in turn.

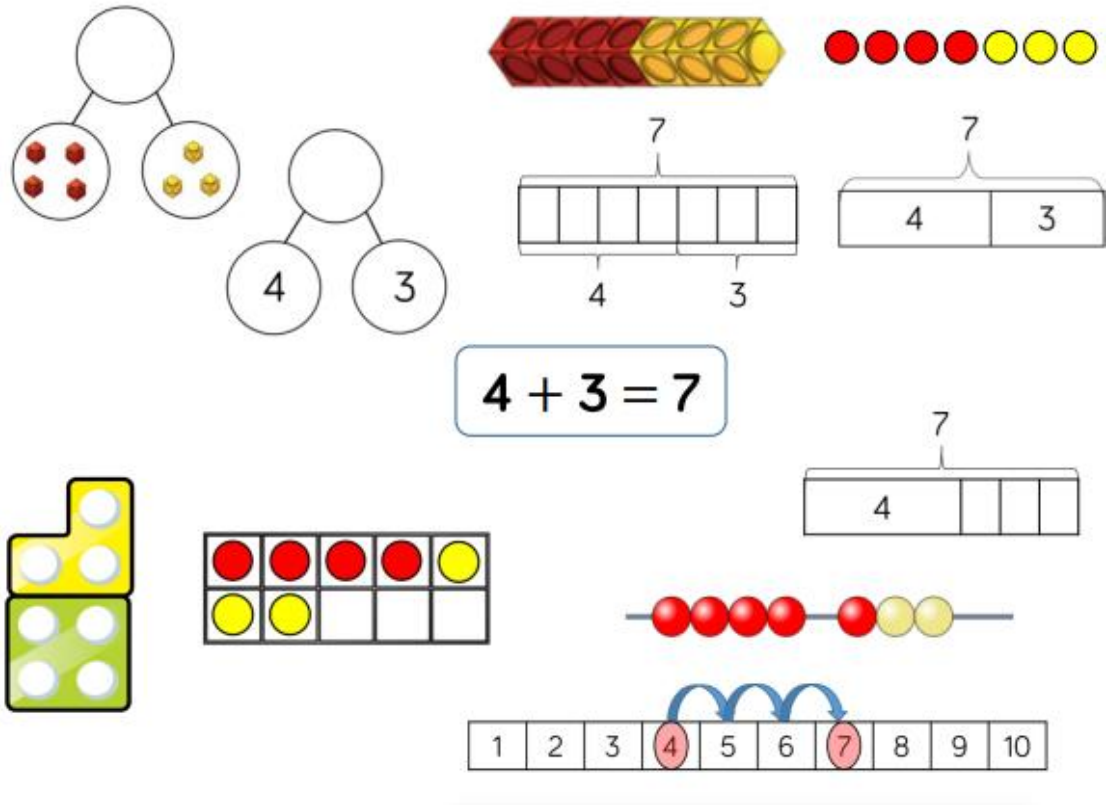
Addition Key Skills

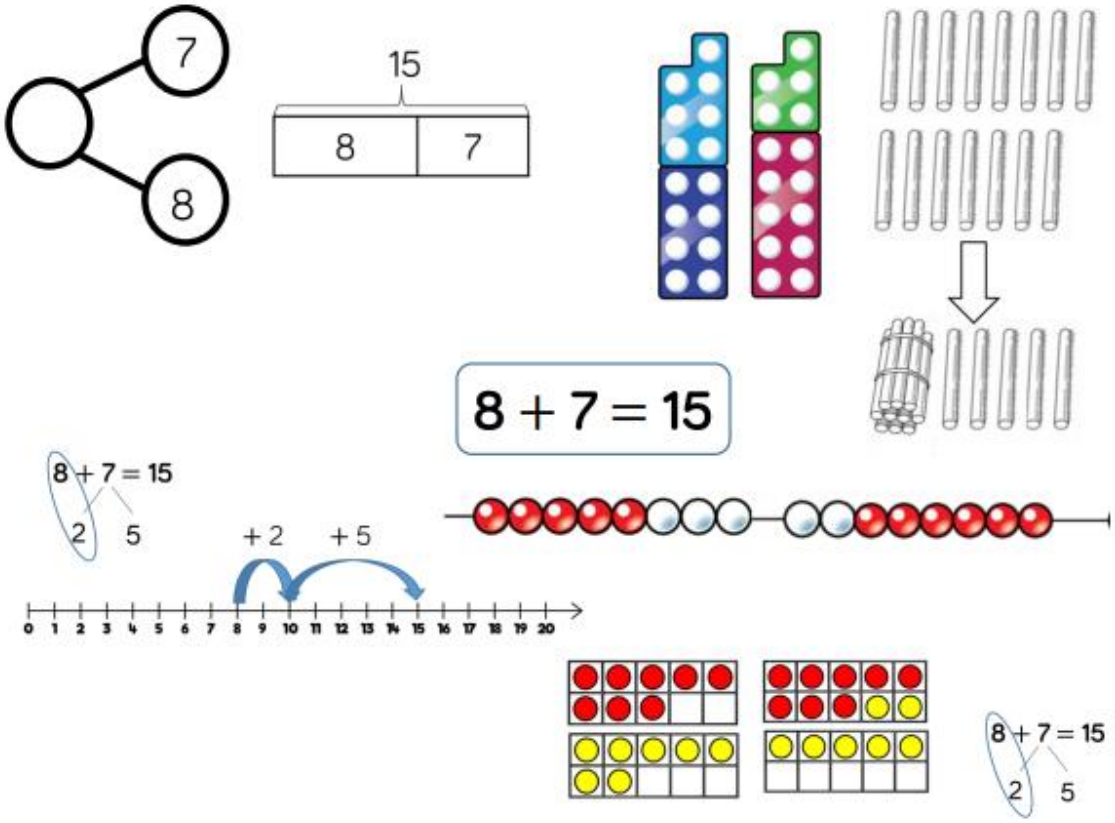
Key Skills	Year Group	Representations and models	
Adding two sets of objects within 5	Little Apples	Counting bears (within 5) Multilink	Number shapes (5) Real life objects
Adding two 1-digit numbers within 5	Reception	Ten frame (within 5) Ten frames (within 10) Bead strings (5)	Number shapes Bead strings (10) Real life objects
Adding two 1-digit numbers within 10	Reception	Ten frame (within 10) Bead strings (10) Part-whole model	Number shapes Bead strings (10)
Adding 1-digit numbers within 10	1	Bar model Part -whole model Number shapes	Ten frames (within 10) Bead strings (10) Number tracks
Adding 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20)	Bead strings (20) Number tracks Number lines (labelled) Straws
Adding three 1-digit numbers	2	Part-whole model Bar model	Ten frames (within 20) Number shapes
Adding 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled)	Number lines (blank) Straws 100 square Dienes / Base 10
Adding two 2-digit numbers within 100	2	Part-whole model Bar model Straws	Number lines (blank) Dienes / Base 10 Column addition

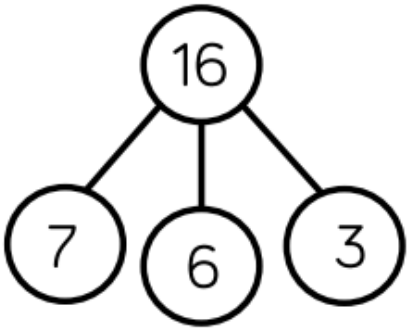
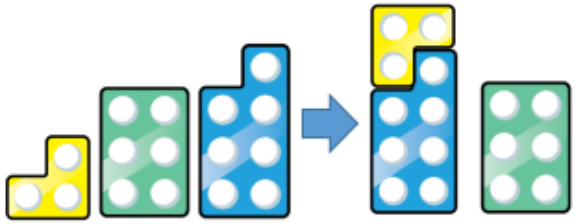
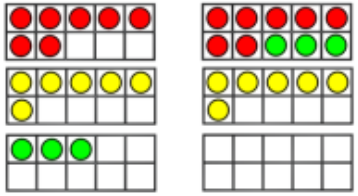
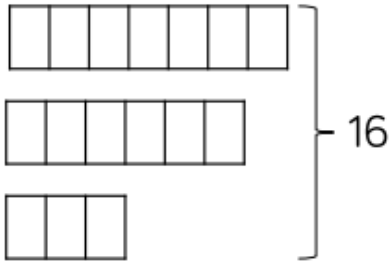
Key Skills: Adding two sets of objects within 5	Little Apples
  	When adding numbers within 5, children explore addition as augmentation and aggregation. When adding two sets of objects together, children use a variety of counting resources including counting bears and multilink as well as real life objects such as shells and pebbles. Children explore addition by simply combining the objects together and counting the total in the combined set. They use the same resources to explore the concepts of subtraction. They start with the whole and take away (subtract) the number of objects they need to, to find how many are left in the set.

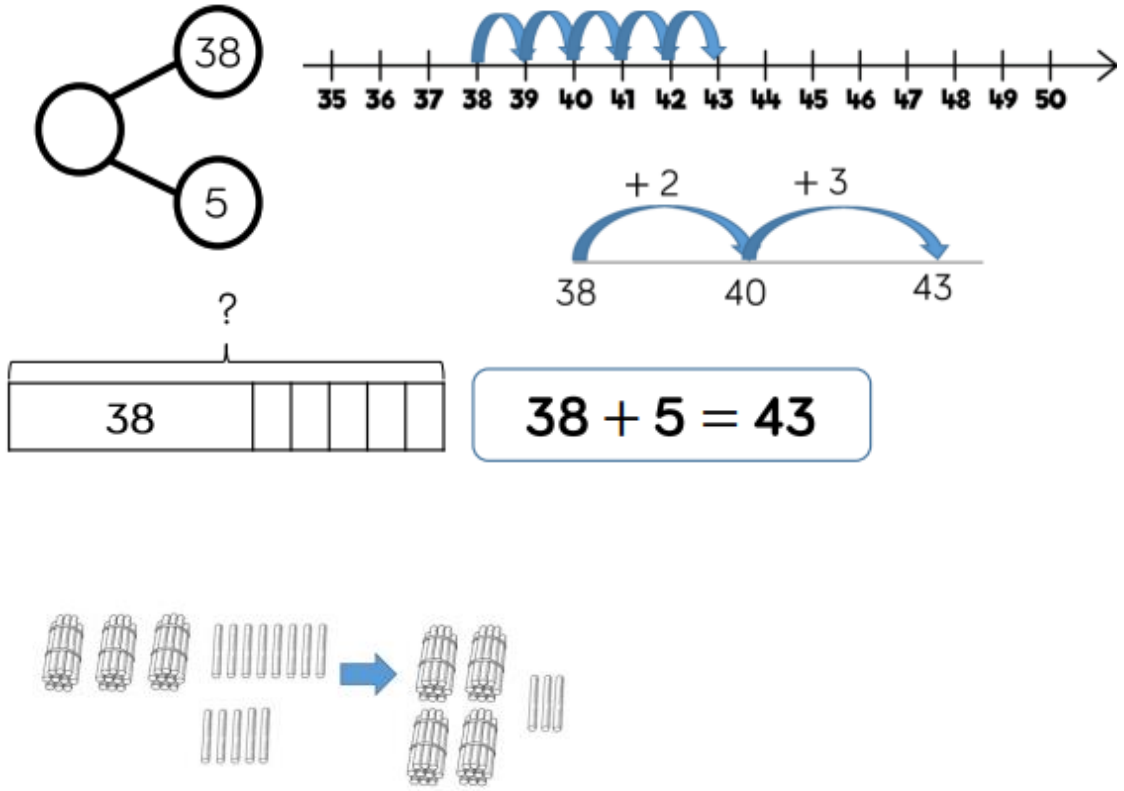
Key Skill: Adding two 1-digit numbers within 5 and within 10	Reception
	When adding numbers within 5, children explore both augmentation and aggregation. We use the part-whole model, the bar model, number shapes and ten frames for aggregation. For augmentation, we use bead strings, number tracks, bar models and ten frames.

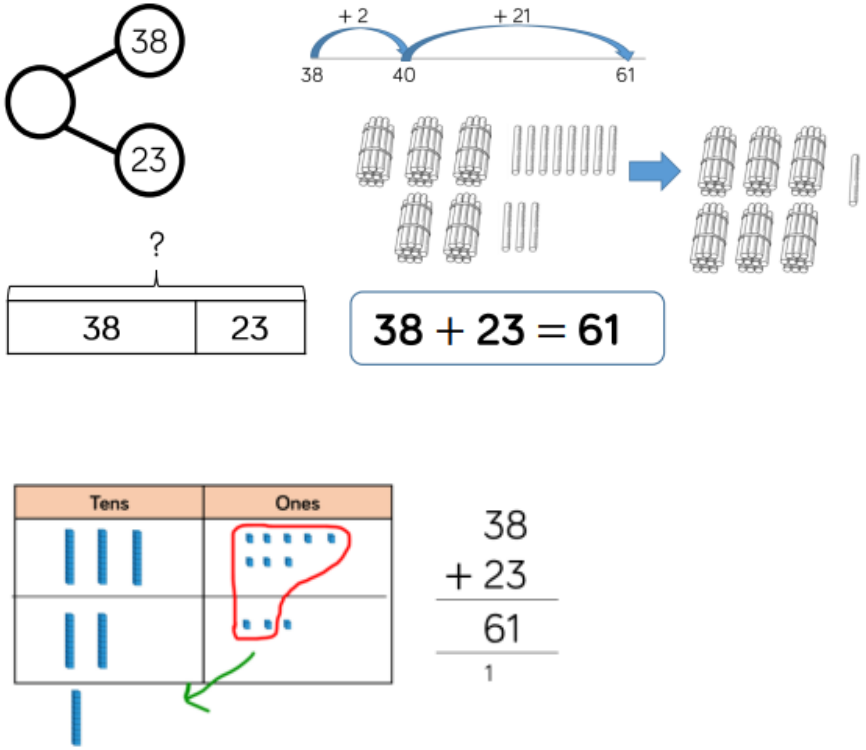
Key Skill: Adding 1-digit numbers within 10	Year 1
	When adding numbers within 5, children explore both augmentation and aggregation. We use the part-whole model, the bar model, number shapes and ten frames for aggregation. For augmentation, we use bead strings, number tracks, bar models and ten frames.

Key Skill: Adding 1-digit numbers within 10	Year 1
	When adding numbers within 5, children explore both augmentation and aggregation. We use the part-whole model, the bar model, number shapes and ten frames for aggregation. For augmentation, we use bead strings, number tracks, bar models and ten frames.

Key Skill: Adding 1-digit and 2-digit numbers to 20	Year 1
	When adding one-digit numbers that add up to over ten, we reiterate that ten ones make ten. We use straws, beads and ten frames to model this exchange. We also use number lines to help children deepen their understanding of bridging across ten and understanding how to partition their numbers by adding to the next ten. This helps with mental Maths calculations.

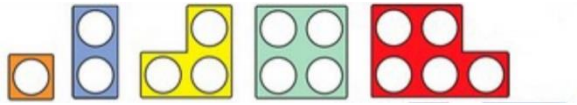
Key Skill: Adding three 1-digit numbers to 20	Year 2
  $7 + 6 + 3 = 16$  $7 + 6 + 3 = 16$ 10 	When adding three 1-digit numbers, we teach children to look for doubles and or number bonds to ten to help them calculate. We teach children that numbers can be added in any order (addition is a commutative operation).

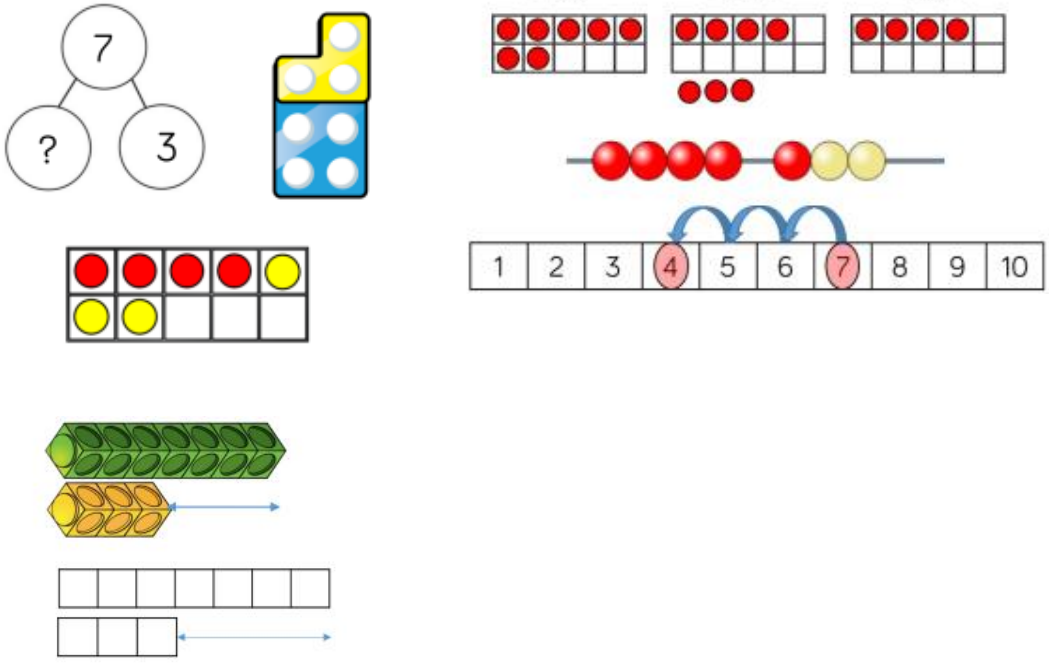
Key Skill: Adding 1-digit and 2-digit numbers within 100	Year 2
	When adding a 1-digit number to a 2-digit number, children are taught to count on from the larger number and apply their understanding of the law of commutativity of addition. They are also encouraged to count on to the next ten and partition their number accordingly to be able to calculate efficiently. To aid children in this, we can use labelled and blank number lines. To model the exchange, we can use straws and Dienes to help children understand that ten ones make one ten.

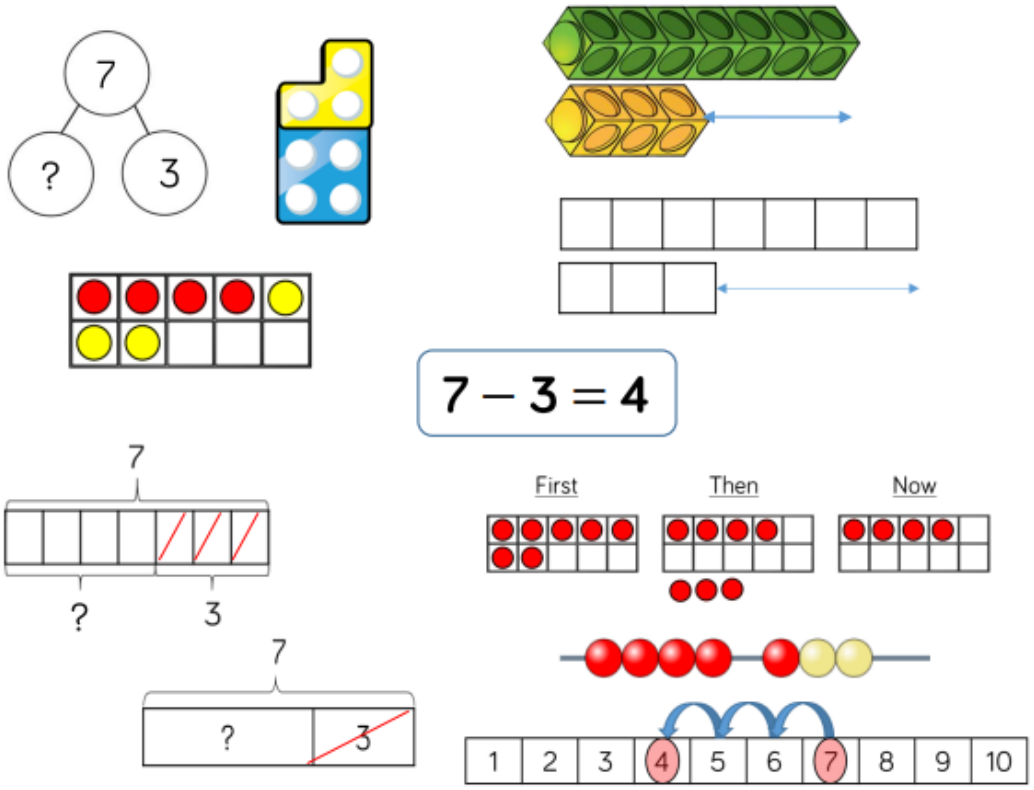
Key Skill: Adding two 2-digit numbers within 100	Year 2
	When adding two 2-digit numbers, we teach children to use blank number lines where they can partition their number efficiently and add on the ones and the multiples of ten in separate steps. We encourage children to always jump to multiples of ten and add on the rest of the number to aid efficiency. If this method is secure, we introduce the column addition method to the children using Dienes / Base 10. Children need to have a secure understanding of the place value of tens and ones and exchanging ten ones for one ten in order to be able to record column addition.

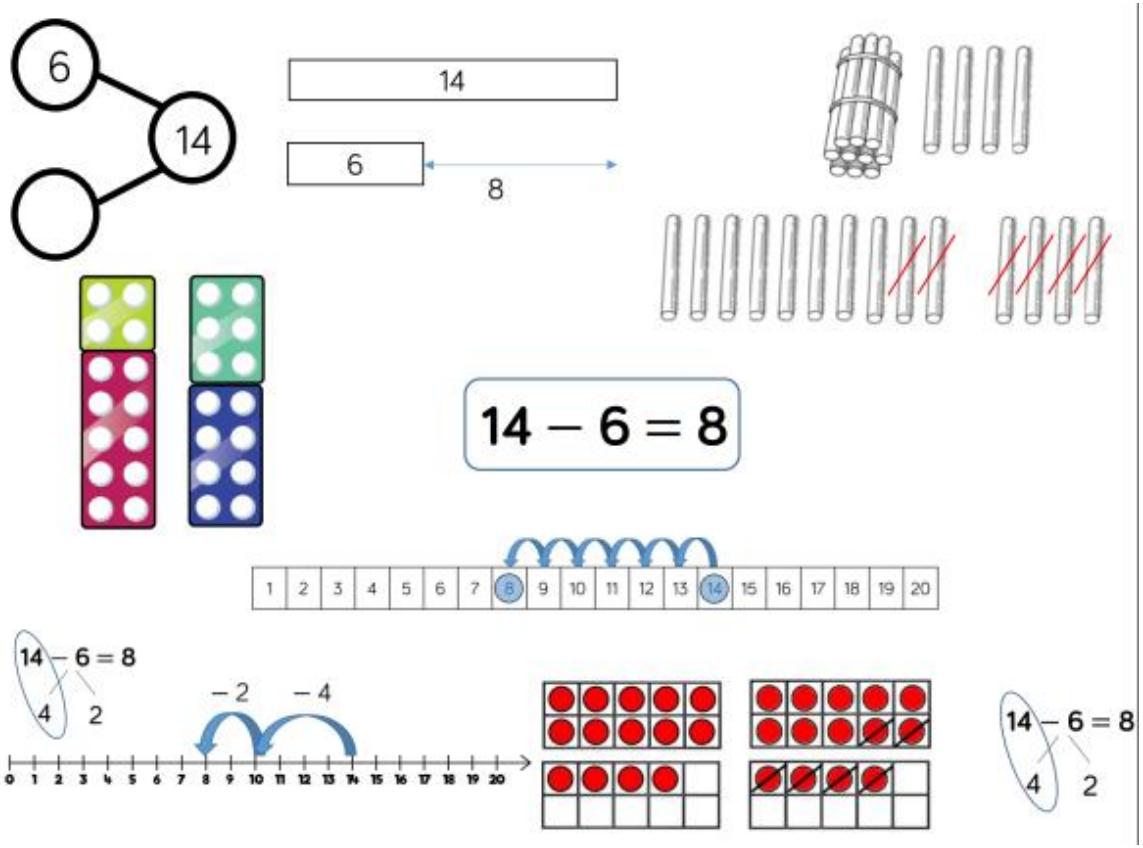
Subtraction Key Skills

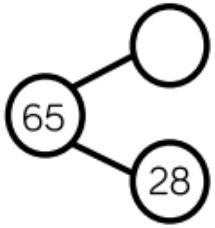
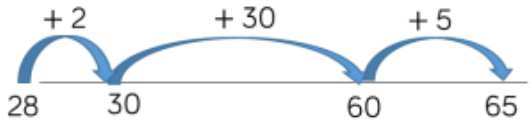
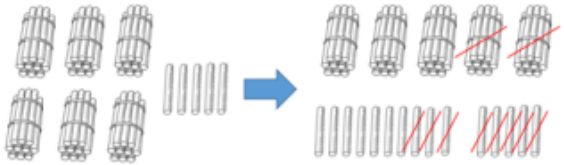
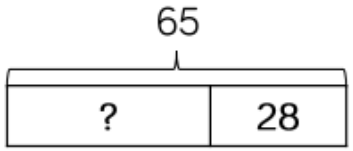
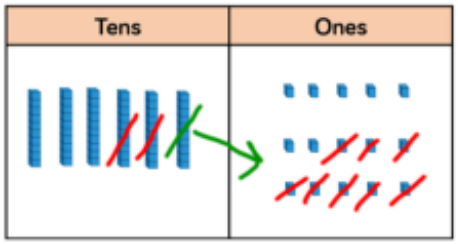
Key Skills	Year Group	Representations and models	
Subtracting one from a set of objects within 5	Little Apples	Counting bears (within 5) Cubes	Number shapes (5) Real life objects
Subtracting one from a number within 10	Reception	Ten frame (within 5) Ten frame (within 10) Bead strings (5)	Number shapes Bead strings (10) Real life objects
Subtracting two 1-digit numbers to 10	1	Bar model Part -whole model Number shapes	Ten frames (within 10) Bead strings (10) Number tracks
Subtracting 1 and 2-digit numbers to 20	1	Part-whole model Bar model Number shapes Ten frames (within 20)	Bead strings (20) Number tracks Number lines (labelled) Straws
Subtracting 1 and 2-digit numbers to 100	2	Part-whole model Bar model Number lines (labelled)	Number lines (blank) Straws 100 square Dienes / Base 10
Subtracting two 2-digit numbers to 100	2	Part-whole model Bar model Straws	Number lines (blank) Dienes / Base 10 Column subtraction

Key Skills: Subtracting one from a set of objects within 5	Little Apples
  	When subtracting numbers within 5, children explore subtraction as reduction. Children explore subtraction through the use of everyday objects and manipulatives. They explore number stories e.g. I had three toys. I gave one to my friend. How many toys do I have now? Children explore subtraction by simply taking away counting cubes.

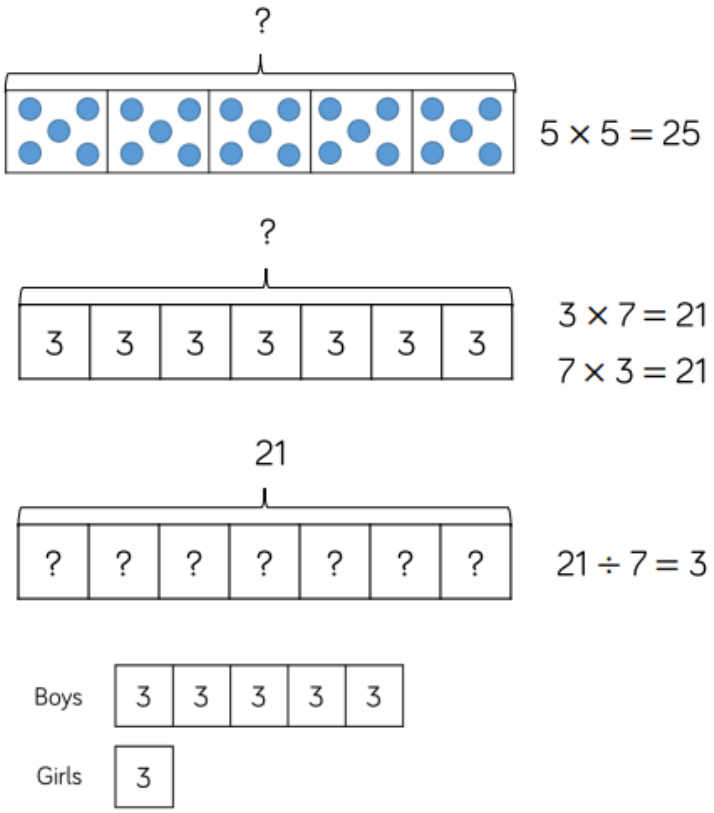
Key Skill: Subtracting 1-digit numbers within 5 and within 10	Reception
	When subtracting numbers within 5 and within 10, children explore both reduction and **difference**? We use bead strings, the part-whole model and ten frames to model reduction. We also use number tracks to demonstrate counting back, jumping back on the number track. To explore difference, we use multilink.

Key Skill: Subtracting 1-digit numbers within 10	Year 1
	When subtracting numbers within 10, children explore both reduction and difference. We use the part-whole model, the bar model and ten frames for partitioning. Ten frames, number tracks and labelled number lines, single bar models and bead strings support subtraction as a reduction. When teaching children subtraction as difference, we use bar models and multilink cubes with two bars to help them see the relationship between the numbers.

Key Skill: Subtracting 1-digit and 2-digit numbers to 20	Year 1
	When subtracting numbers within 20, when subtracting across ten, children need to understand that 1 ten can be exchanged for 10 ones. We also teach children to use their making ten strategy to help them partition their number effectively and count back to a multiple of ten. Number lines and number tracks help children see this process. This helps with mental Maths calculations.

Key Skill: Subtracting 1-digit and 2-digit numbers within 100	Year 2
    $65 - 28 = 37$  $\begin{array}{r} {}^{5}\not{6}\,{}^{1}\not{5} \\ -\ 2\ 8 \\ \hline 3\ 7 \end{array}$	When subtracting 1-digit and 2-digit numbers, children are taught to use the blank number line and partition their numbers effectively by counting back to a multiple of ten and subtract the rest of the number in smaller steps. We also use straws and Dienes/Base ten to consolidate their understanding of exchange before moving towards the formal recording of column subtraction. Children need a secure understanding of place value and that one ten can be exchanged for 10 ones before starting column subtraction. We use Dienes alongside the formal recording to show children the process of exchange.

PART 2: Multiplication and division

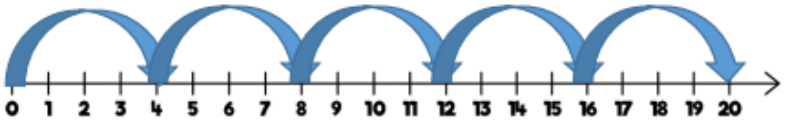
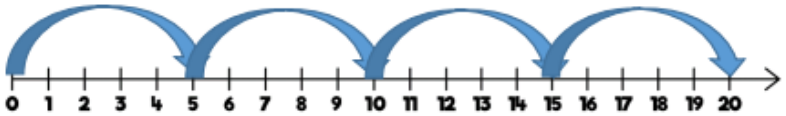
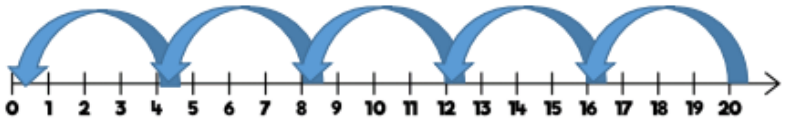
Bar Model	
	We use single bar models to explore multiplication as repeated addition. We use counters and dots to represent the number in the bar model before writing digits into the bar models to represent the multiplication. We explore division through representing the total by a single bar that is then divided into equal groups/ terms. When we are teaching scaling word problems, for example, we have five times as more boys in our sports than girls. There are 3 girls in our sports club. How many boys are in the club? In this case, when exploring scaling problems, we use bar models with more than one bar to represent the relationship between the two numbers.

Bead Strings	
 $5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 3 = 5$  $5 \times 3 = 15$ $3 \times 5 = 15$ $15 \div 5 = 3$  $4 \times 5 = 20$ $5 \times 4 = 20$ $20 \div 4 = 5$	We use bead strings to 100 to explore multiplication as repeated addition and division as repeated subtraction. We build the multiplication as repeated addition using beads and encourage children to count in groups. For example, working out 5 groups of 3, we would ask children to count in three and use the beads to work out the total using their knowledge of tens and ones (using the colour coding of bead strings). When dividing, children start with making the number that they are dividing and make equal groups of the number that they are dividing by. For example, 20 / 4 = 5 Children will make 20 and then make equal groups of 4 from twenty and find how many equal groups of 4 there are which will be the answer to the division question. This links well with division as repeated subtraction.

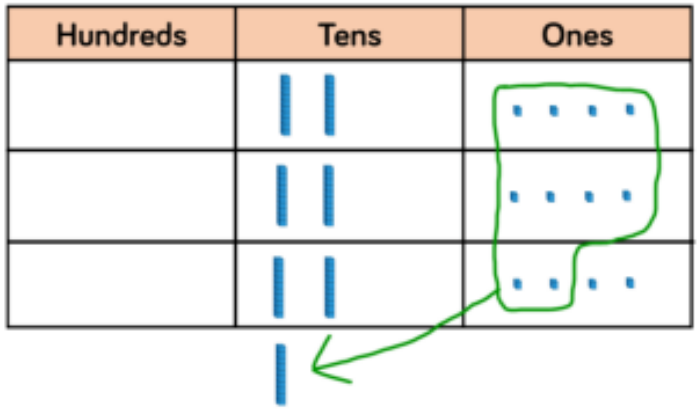
Number tracks	We use number tracks to help children count in multiples forwards and backwards. Using counters help them to keep track of their counting. When multiplying, children start on 0 and count on to find the product. For example, when solving 6 x 3, children count on in 3s and make six jumps of 3s as the multiplication number sentence says 6 groups of 3, not 3 groups of 6. We can explore commutative law of multiplication through number tracks to investigate that the product is always the same irrespective of which order we are multiplying the numbers in. When dividing, children start with the number they are dividing and count back in jumps of the number they are dividing by until they reach 0. Then they count how many jumps they were able to make. This links with repeated subtraction.

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

$18 \div 3 = 6$

Number lines (labelled)	
  $4 \times 5 = 20$ $5 \times 4 = 20$  $20 \div 4 = 5$	We use number lines to help children count in multiples forwards and backwards. When multiplying, children start on 0 and count on to find the product. For example, when solving 4 x 5, children count on in 5s and make 4 jumps of 5 as the multiplication number sentence says 4 groups of 5, not 5 groups of 4. We can explore commutative law of multiplication through number lines to investigate that the product is always the same irrespective of which order we are multiplying the numbers in. When dividing, children start with the number they are dividing and count back in jumps of the number they are dividing by until they reach 0. Then they count how many jumps they were able to make. This links with repeated subtraction.

Dienes / Base Ten (Multiplication)

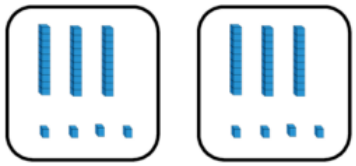


We use Dienes / Base Ten to help children multiply 2-digit numbers with 1-digit numbers.

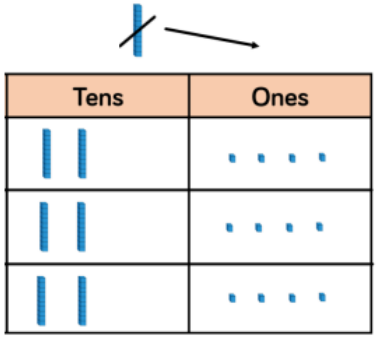
In year 2 we do not record multiplication in the formal way using column multiplication but use Dienes / Base Ten to work out the product.

For example, in order to work out 24 x 3, we would encourage children to remember the commutative law of multiplication i.e. that the product is always the same irrespective of which order the numbers are multiplied.
So in this example, we would encourage children to make 3 x 24 using Dienes / Base Ten to work out the product. Children would make the number and exchange 10 ones for 1 ten if appropriate to find the product.

Dienes / Base Ten (Division)	We use Dienes / Base Ten to help children divide larger 2-digit numbers. In year 2 we do not record multiplication in a formal way, but teach children to share the number they are dividing into the number of equal groups that they are dividing by. For example, 68 / 2 means that we share 68 into two equal groups. For example, in order to work out 72 / 3, we encourage children to make the number using Base Ten. Then they must start with the largest place value column – in this case it is the tens and share the number of tens equally between 3 groups. They will notice that they can have 3 equal groups of two tens with 1 ten that needs to be exchanged before they can share the rest of the ones. Children need to know that they are always working from left to right in the place value column when sharing larger 2-digit numbers. Children will use Dienes / Base Ten resources to work out division questions within 100.



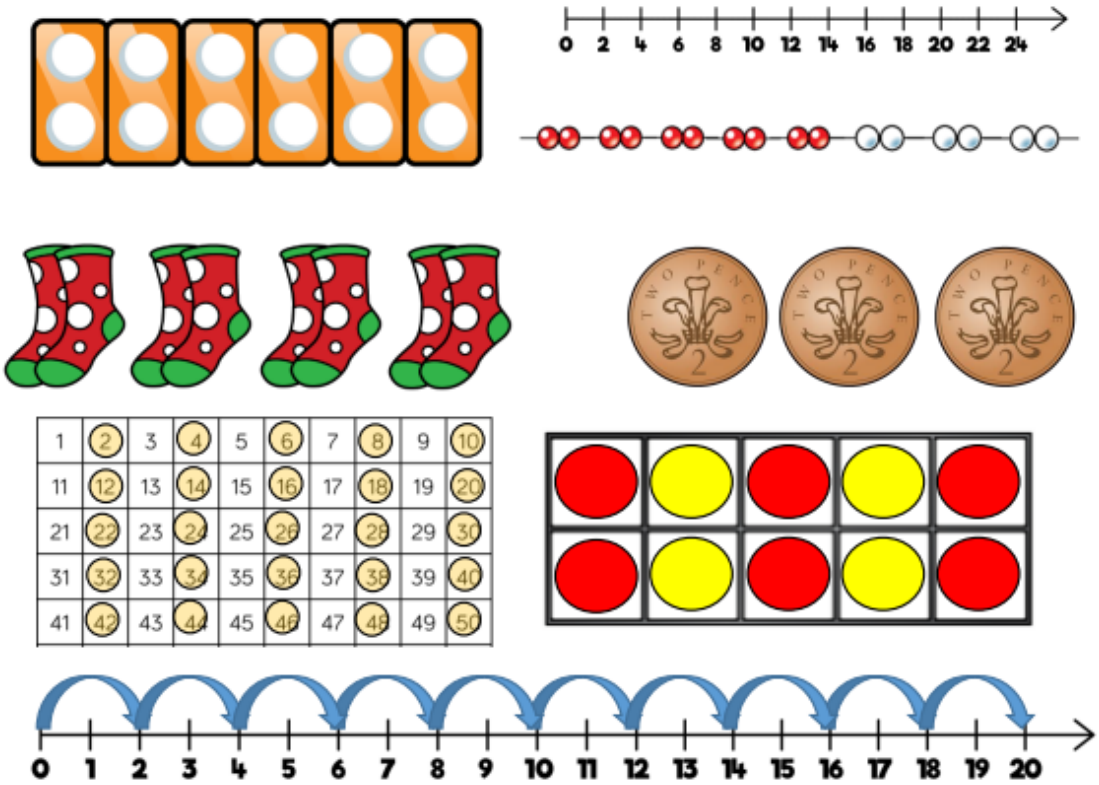
$68 \div 2 = 34$

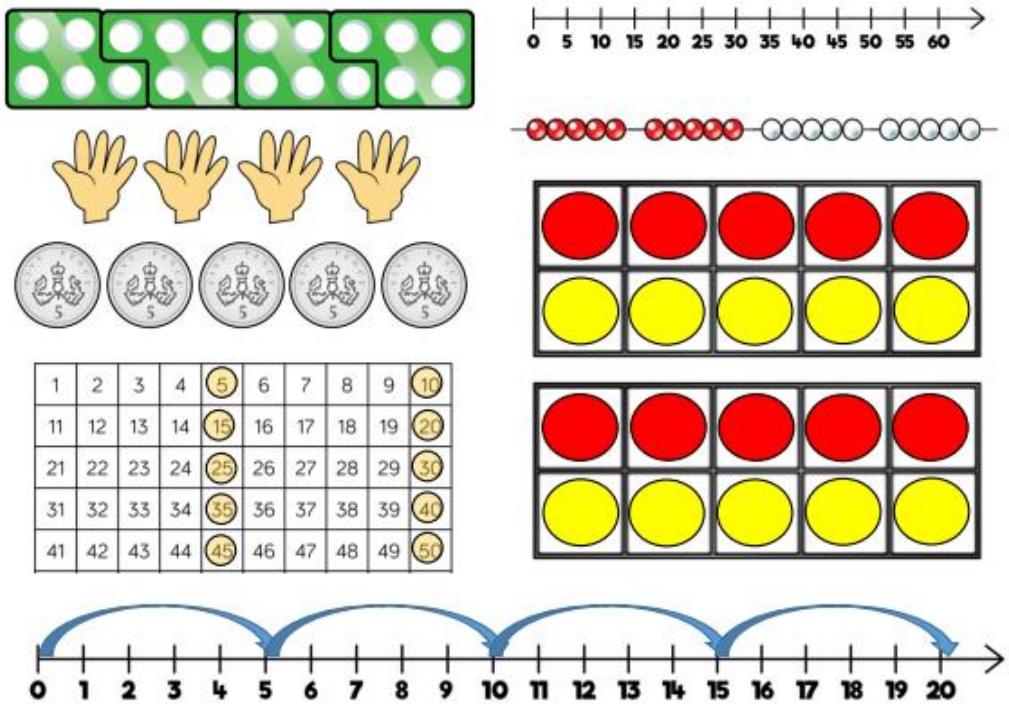


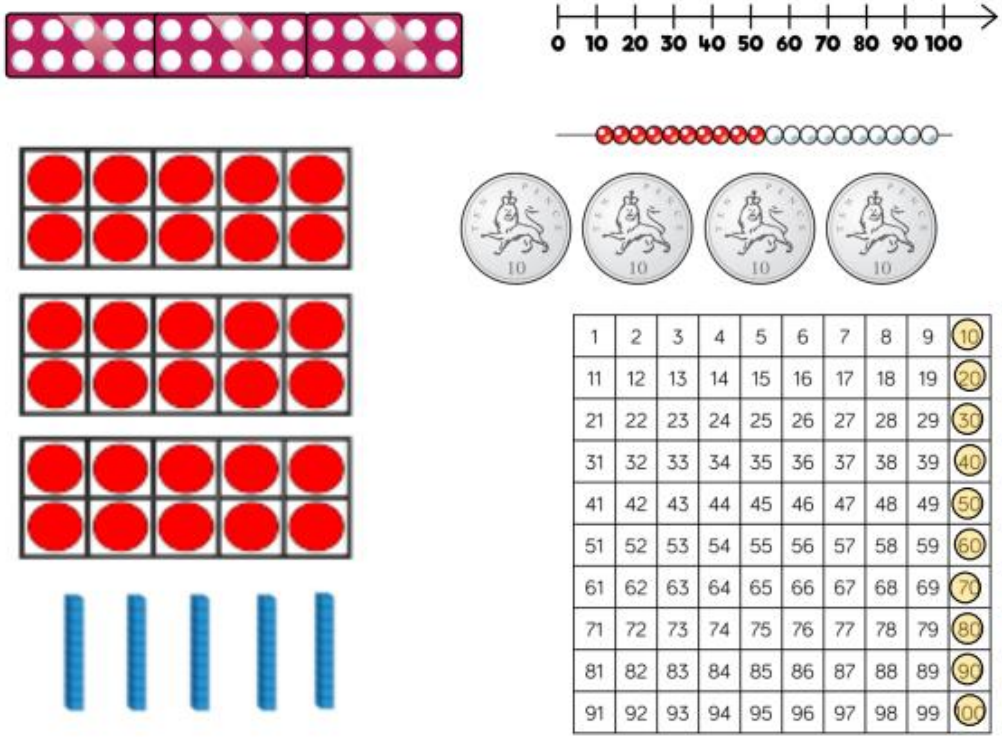
$72 \div 3 = 24$

Times Tables

Key Skills	Year Group	Representations and models	
Recall and use multiplication and division facts for the 2 times table	2	Bar model Ten frames Bead strings	Number tracks / number lines Hundred square Money
Recall and use multiplication and division facts for the 5 times table	2	Bar model Ten frames Bead strings	Number tracks / number lines Hundred square Money
Recall and use multiplication and division facts for the 10 times table	2	Bar model Ten frames Bead strings	Number tracks / number lines Hundred square Money Dienes / Base Ten

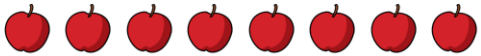
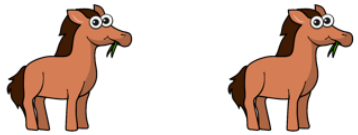
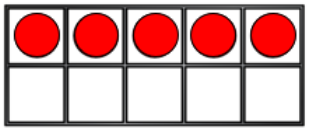
Key Skill: 2 times table	Year 2
	We count in multiples of 2 backwards and forwards to develop fluency and recall using a number line and a 100 square. We use concrete manipulatives to explore patterns in the two times table. For example, using counters, children can explore that all the numbers in the two times table are even and that the number ones have a pattern in even numbers (in number in the 2 times table) i.e. 0, 2, 4, 6 and 8. We use a variety of manipulatives to aid fluency.

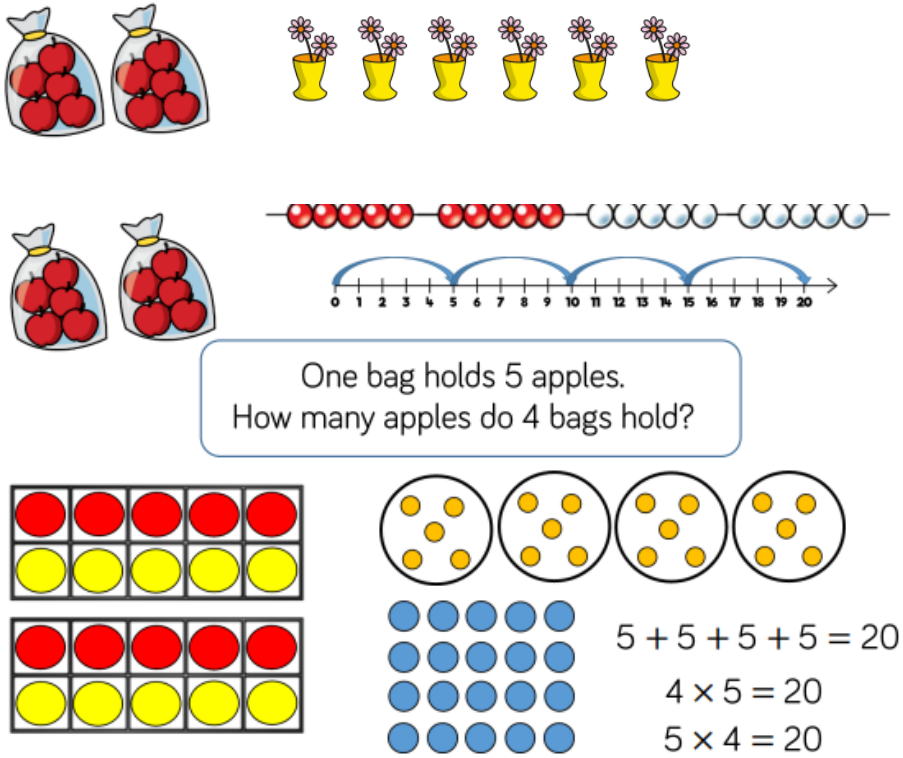
Key Skill: 5 times table	Year 2
	We count in multiples of 5 backwards and forwards to develop fluency and recall using a number line and a 100 square. We use concrete manipulatives to explore patterns in the five times table. For example, using counters, children can explore that the numbers in the five times table are have a continuous sequence of even and odd numbers e.g. 5, 10, 15, 20 etc. We can also explore how the ones digit changes and follows a repeating pattern in the five times table i.e. 5, 0, 5, 0 We use a variety of manipulatives to aid fluency.

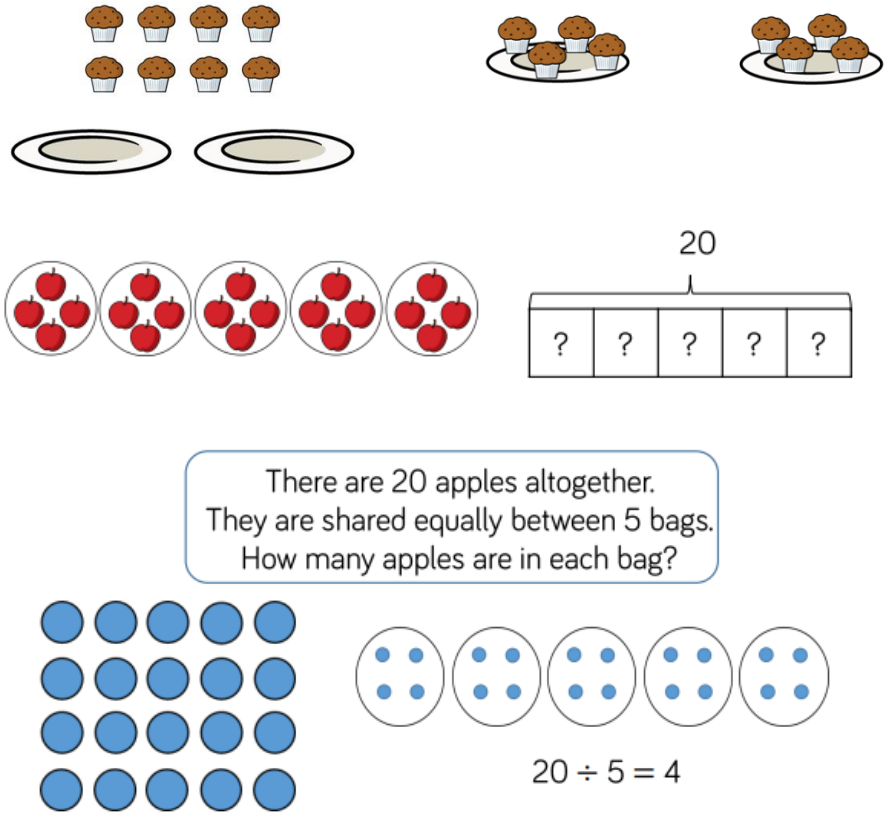
Key Skill: 10 times table	Year 2
	We count in multiples of 10 backwards and forwards to develop fluency and recall using a number line and a 100 square. We use concrete manipulatives to explore patterns in the ten times table. For example, using counters and ten frames, children can explore that the numbers in the ten times table are always even numbers. We can also explore how the ones digit never changes and is zero. Whereas, children can explore that the tens digit changes and is increased by 1 each time. We use a variety of manipulatives to aid fluency.

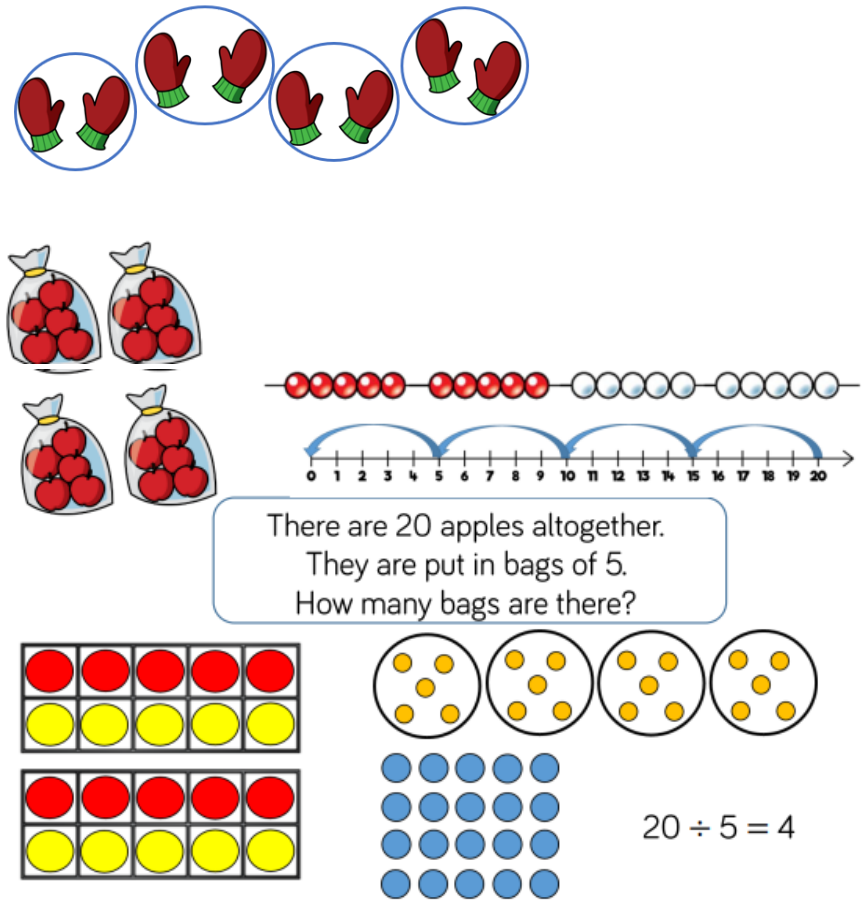
Multiplication and Division

Key Skills	Year Group	Representations and models	
Doubling and halving within 10	Reception	Counters Ten frame	Real life objects
Solving one step problems with multiplication	Year 1 / 2	Bar model Counters Ten frames	Bread strings Number lines
Solving one step problems with division (sharing)	Year 1 / 2	Bar models Real life objects	Counters Arrays
Solving one step problems with division (grouping)	Year 1 / 2	Real life objects Bead strings Counters	Ten frames Number lines Arrays

Key Skill: Doubling and halving amounts within 10	Reception
    Double 1 is 2  Double 4 is 8  Double 2 is 4   Double 3 is 6 Double 5 is 10	We explore multiplication and division using manipulatives and real life objects. For example, children solve simple multiplication (doubling) problems such as I have two teddy bears and my brother has twice as many (double). How many teddy bears does my brother have? Children use counters or real life problems to show doubling. They are introduced to doubling in a ten frame by representing the doubles as two different colours i.e. 3 yellow and 3 red counters show double three, six counters altogether. Children explore the sharing aspect of division in Reception. They share different amounts into equal and unequal groups and explore what makes groups equal and unequal. For example, find some friends, organise your selves into groups. Are they equal or unequal. Another example would be, can you share 8 apples equally between two horses? How many apples do they each get?

Key Skill: Solving one step problems with multiplication	Year1 / 2
	We explore multiplication as repeated addition in many different ways. We use concrete manipulatives and counters as well as bead strings and number tracks and number lines to calculate the product. In Year 1, children do not record their calculations formally using the multiplication symbol but they are expected to be able to use repeated addition to represent a multiplication problem after they have used concrete and pictorial representations. For example, in order to work out how many flowers there are altogether, they know that there are 6 vases or 6 groups of flowers and there are 2 flowers in each group. They will be able to write a repeated addition number sentence based on this word problem i.e. 2 + 2 + 2 + 2 + 2 + 2 = 12 In Year 2, children are introduced to the multiplication symbol and are able to make links with multiplication being repeated addition. They understand that 5 + 5 + 5 + 5 = 20 is 4 x 5.

Key Skill: Solving one step problems with division (sharing)	Year1 / 2
	We explore the sharing aspect of division by sharing amounts into equal groups. For example, 20 / 4 means that we share 20 into four equal groups. In Year 1, children use concrete and pictorial representations in order to work problems out and do not record division calculations. For example, when solving the problem of sharing the muffins equally between two people (two groups), children will share real life objects or manipulatives to work out the problem. They are able to explain that the muffins are shared equally between 2 groups / people. There are 4 muffins in each group and that there are 8 muffins altogether. In Year 2, children continue to use manipulatives and are introduced to the division symbol. They represent sharing division problems pictorially by drawing the groups as circles and the number to be shared as counters. They are able to make links with the pictorial representations and the written division calculation. For example, they understand that 20 / 4 means that they have to share 20 into 4 equal groups.

Key Skill: Solving one step problems with division (grouping)	Year1 / 2
	We explore the grouping aspect of division by grouping amounts. In Year 1, children use concrete and pictorial representations in order to work problems out and do not record division calculations. For example, when children have to find how many groups there are if they put 8 mittens in groups of 2, children can use manipulatives. They take 2 counters out of the amount to be divided (8 mittens) and keep repeating until they reach zero. They will find that there are 4 groups of 2 mittens that they could have from 8 mittens altogether. This links with counting in multiples of a number. In Year 2, children continue to use manipulatives and explore the grouping aspect of division as repeated subtraction and represent this on a number line. They also explore the relationship between division and multiplication using arrays.