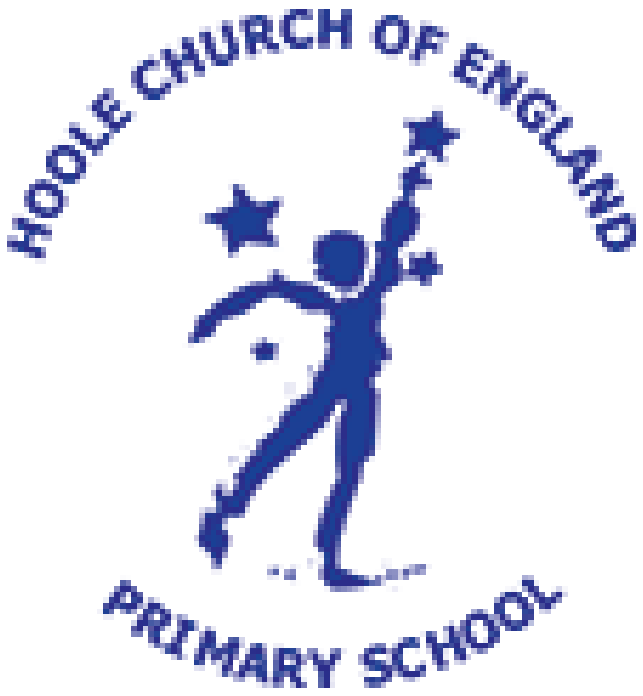
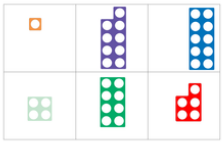
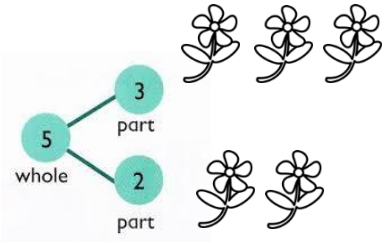
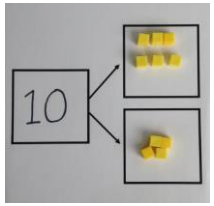
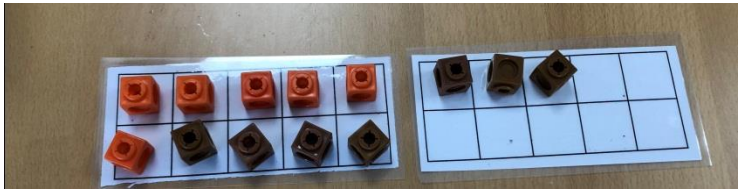
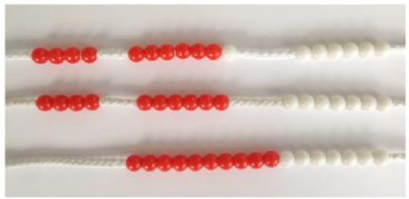
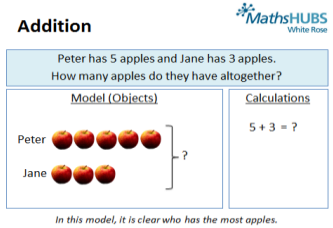
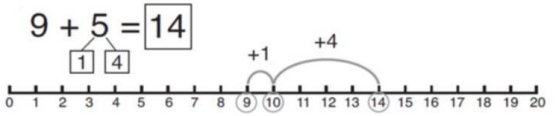
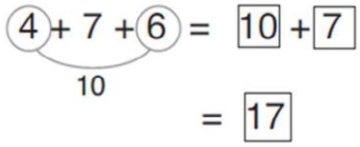
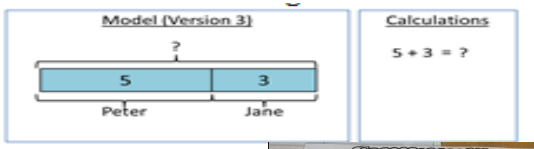
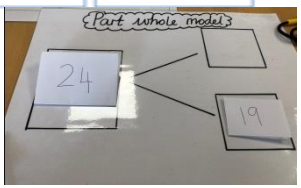
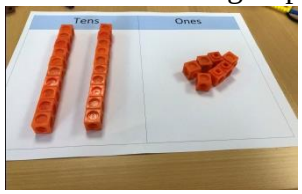
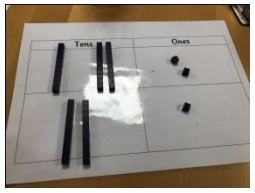
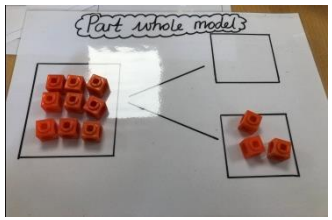
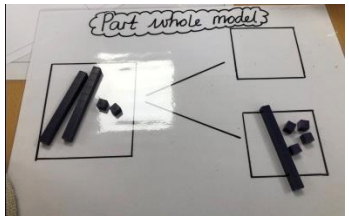
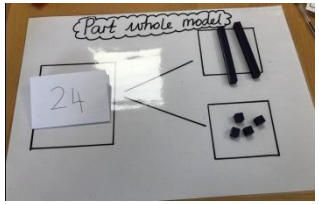
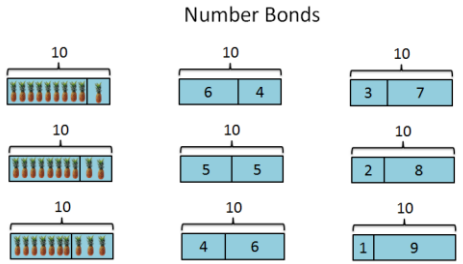
Addition



EYFS		
Concrete	**Pictorial**	**Abstract**
Children will use a range of counter style resources in order to count on and back from a given number. They will use a range of apparatus to support them to find one more or less than a number. They will use quantites and objects to add and subtract two single digit numbers and count on and back. They solve problems, including doubling, halving and sharing. Resources used to support numbers within 10 e.g. 5 + 1, 4 + 3 etc    Use cubes/counters and other objects to add two numbers together as a group or in a bar. Numicon will be used to support calculations and to embed understanding of value of numbers.  Tens frames will be used to support children's calculations.  4 + 6 = 10	Although children will not need to directly record, children will be exposed to a range of pictorial representations through teaching opportunities. Part whole model to represent addition. 3 + 2 = 5 	Teachers will model simple number sentence construction. Reinforce mathematical language so children are able to make links to their learning. The children will continue to use concrete appartus to develop links. 5 + 3 = 8 7 + 2 = 9 6 + 3 = 9

 Part whole model to represent relationships between numbers using addition. Bead strings to be used to support counting on/back from a given number. 		

Year 1		
Concrete	**Pictorial**	**Abstract**
Children will use a range of mathematical resources to represent number bonds within 20, to support addition of one digit and two digit numbers and to solve one step problems. **Multilink to show addition**  Children will use **tens frames** to support addition of number, identifying relationships and use of number bonds to support addition.  Children will use **bead strings** to accurately calculate addition of two/three numbers. 4 + 7 + 6= 17 Put 4 and 6 together to make 10. Add on 7.  Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	In year 1, the children will continue to embed their knowledge of relationships with numbers in order to apply them to a range of addition calculations. Children will continue to build their knowledge and use of bar model and part whole model. **Bar model** Children will develop the use of bar model to support calculations.   **Part/whole model** One relationship shown by this part whole model is 15 + 5 = 20. Can you write all associated fact facts in the sentences below?  Children will use the part whole model in pictorial and a more abstract form to show representations of addition/number relationships.	Children will record number sentences in an abstract form, using pictorial and concrete appartus to support. **Number line** Children will continue to use their knowledge of number bonds to support abstract forms.  Combine the two numbers that make 10 and then add on the other number.  **Bar model**  **Part whole model** 

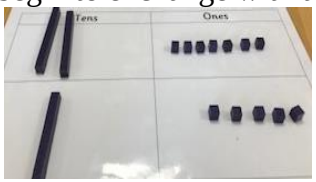
Children will begin to use **tens and ones frames**, supported by **base 10** to add two digits together to find a total, embedding their understanding of place value.   **Part whole models** will continue to be used in the concrete form where needed.   	**Pictures to represent calculations** 	
Year 2		
Concrete	**Pictorial**	**Abstract**

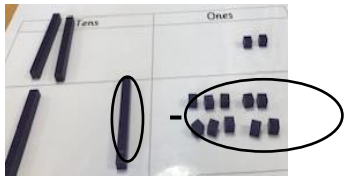
Children in year 2 will use a range of mathematical apparatus to represent addition of a two digit number and ones, a two digit number and tens and two, two digit numbers. Children will use apparatus to enable them to recognise relationships between numbers and number operations.

Children in year 2 begin adding 2 and 1 digit numbers where exchanging isn't needed using base 10 as a review from previous year. Children will be given the opportunity to use a range of concrete materials to support their learning.

Base 10

When this has been mastered children will need to add with numbers that need exchanging, using base 10. They will then begin to exchange with the place value counters.



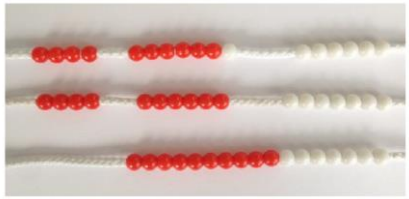


Children will use a variety of resources to support their understanding of addition of numbers in order to embed key skills and to build on from previous years learning, including:

Bead strings

4 + 7 + 6= 17

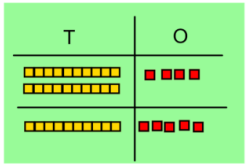
Put 4 and 6 together to make 10. Add on 7.



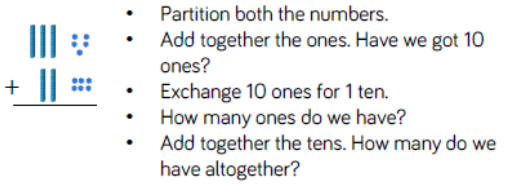
Part whole model using base 10

Base 10

Children can then progress to drawing a pictoral representation of the columns and base 10 . First of all alongside the practical equipment and then without.



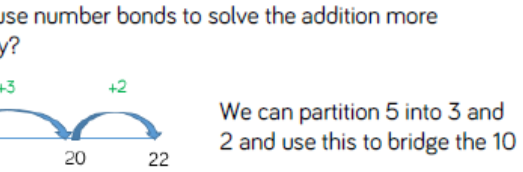
Add up the ones and exchange 10 ones for one 10. The children can draw an arrow underneath to identify which place value column they move into. The children can then progress to using concrete/pictorial images to support column addition.



Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added.

Children should use the concrete/pictorial representations alongside the abstract.

Children will use their number bond knowledge to support the use of the **number line** for addition.



Year 2 children will start by adding using their knowledge of **partitioning.** They will partition 2 digit numbers into tens and ones. They will add the tens, add the ones and then combine the answer together.

Written methods

Children will progress through the different abstract representations and once they have learnt these methods children will apply them to a range of problem solving calculations.

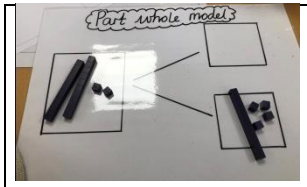
25 + 13 =

20 + 10 = 30

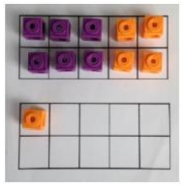
5 + 3 = 8

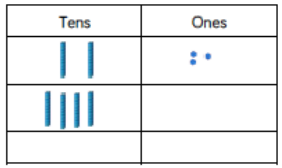
30 + 8 = 38

$$\begin{array}{rcl} 20 & + & 5 \\ \underline{40} & + & \underline{8} \\ 60 & + & 13 \end{array} = 73$$



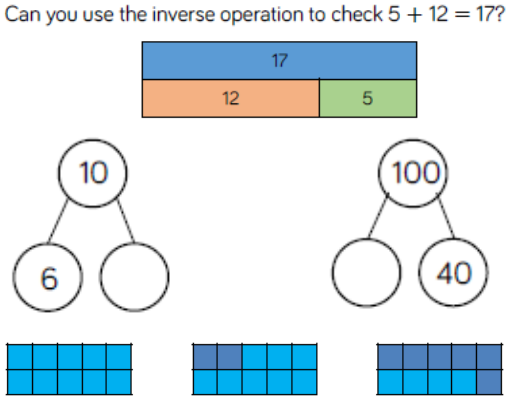
Tens frames





$$\begin{array}{r} 2\ 3 \\ +\ 4\ 0 \\ \hline \end{array}$$

Additionally, the use of pictorial forms of the **bar model, part whole model and tens frames** will continue to build solid foundations of number.

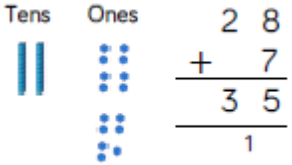


Calculations

21 + 42 =

$$\begin{array}{r} 21 \\ +\ 42 \\ \hline \end{array}$$

Once children are confident with this, then will move on to recording this using the expanded method. They should begin with numbers that don't require exchanging, building up to the ones exchanging and then the tens.

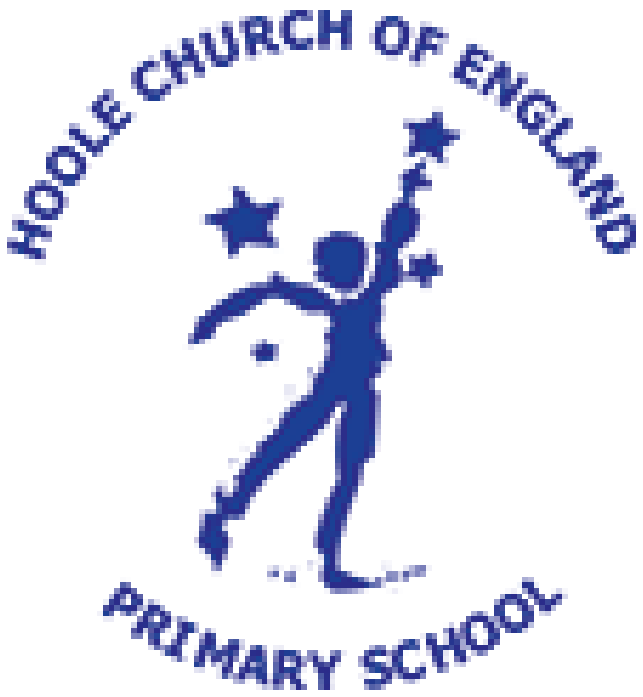


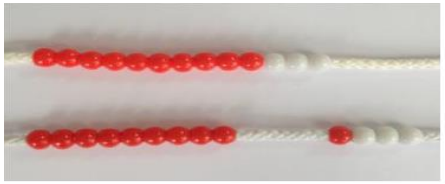
$$\begin{array}{r} 2\ 8 \\ +\ \ 7 \\ \hline 3\ 5 \\ \hline \end{array}$$

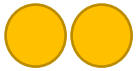
1

$$\begin{array}{r} 34 \\ +\ 12 \\ \hline 6 \quad (4 + 2) \\ 40 \quad (30 + 10) \\ \hline 46 \end{array}$$

Subtraction



EYFS		
Concrete	**Pictorial**	**Abstract**
Children will use a range of counter style resources in order to count on and back from a given number. They will use a range of apparatus to support them to find one more or less than a number. They will use quantites and objects to add and subtract two single digit numbers and count on and back. They solve problems, including doubling, halving and sharing.    Use **cubes/counters and other** objects to subtract a number from a given number. **Tens frames** will be used to support children's calculations. 10 – 4 = 6  **Bead strings** to be used to support counting on/back from a given number. Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.  Other counting apparatus will continue to be used to support children's learning.	Although children will not need to directly record, children will be exposed to a range of pictorial representations through teaching opportunities. **Part whole model** to represent subtraction.	Teachers will model simple number sentence construction. Reinforce mathematical language so children are able to make links to their learning. The children will continue to use concrete appartus to develop links. 8 – 3 = 5 5 – 1 = 4

Use **physical objects, counters, cubes** etc to show how objects can be taken away.  6 – 2 = 4    Use counters and move them away from the group as you take them away counting backwards as you go. 		

Year 1		
Concrete	**Pictorial**	**Abstract**

Children will use a range of mathematical resources to represent number bonds within 20, to support subtraction of one digit and two digit numbers and to solve one step problems.

Children should be exposed to a range of the following concrete apparatus, as the teacher feels appropriate.

Tens frame

Children will use tens frames to support subtraction of number, identifying relationships and use of number bonds to support .

14 – 9 =

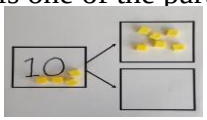
Make 14 on the ten frame. Take away the 4 first to make 10 and then takeaway away 5. You are left with 9.

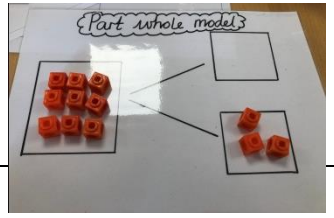
Part whole model

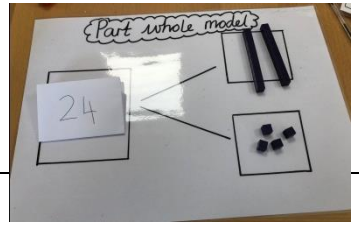
Link to addition- use the part whole model to help explain the inverse between addition and subtraction.

10 - 6 =

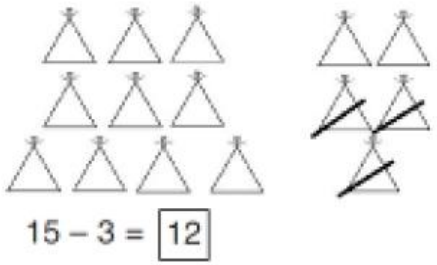
If 10 is the whole and 6 is one of the parts. What is the other part?



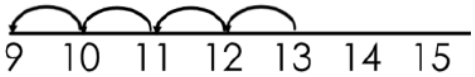




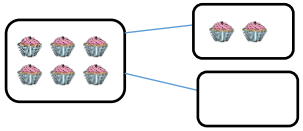
Cross out drawn objects to show what has been taken away.



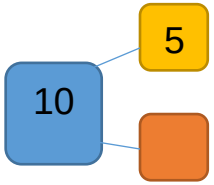
Count back on a **number line or number track**

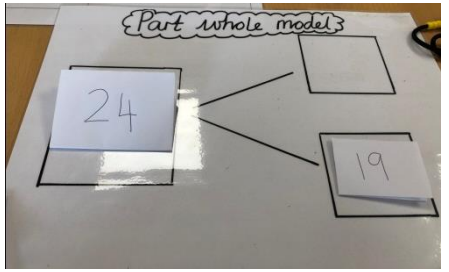


Use a pictorial representation of objects to show the part/ **part/ whole model.**



Move to using numbers within the **part whole model.**



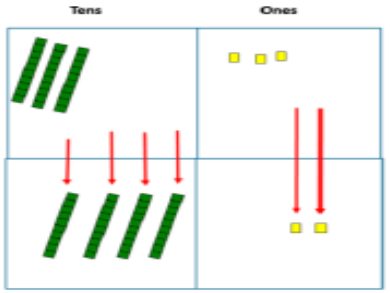
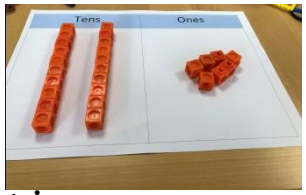
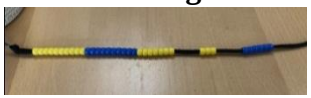


Written number sentences

16 – 8 =

How many do we take off to reach the next 10?

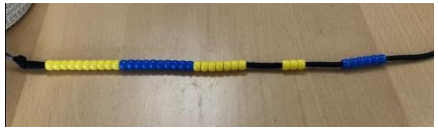
How many do we have left to take off?

Use **Base 10** to make the bigger number then take the smaller number away.  Show how you partition numbers to subtract. Again make the larger number first. **Multilink** can be used as well as base 10 to embed.  **Number string** 		
Year 2		
Concrete	**Pictorial**	**Abstract**

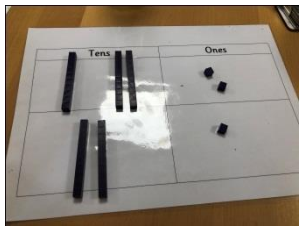
Children in year 2 will use a range of mathematical apparatus to represent subtraction of a two digit number and ones, a two digit number and tens and two, two digit numbers. Children will use apparatus to enable them to recognise relationships between numbers and number operations.

Ensure the use of place value is embedded through number calculations using base 10 in a range of contexts.

Bead strings

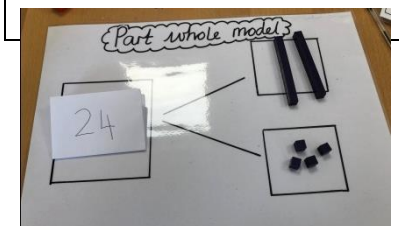


Tens frames

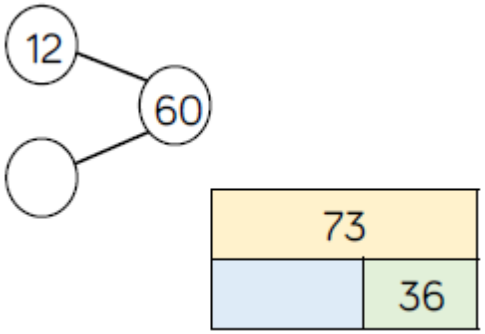


Tens and ones – base 10

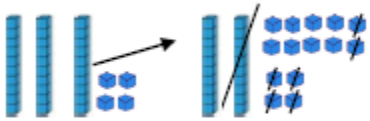
Part whole model



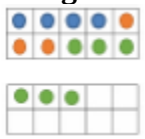
Bar model and part whole model



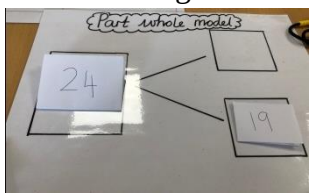
Informal jottings of base 10



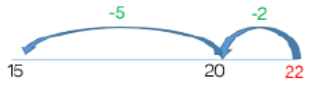
Draw pictorial images of tens frame to support calculations as an informal jotting.



Part whole model – using numbers or pictures

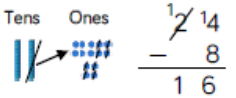


Number lines using number bond knowledge.



We can partition 7 into 5 and 2 and use this to bridge the 10

Column method using concrete and pictorial to support.



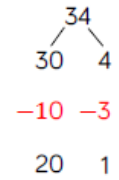
$$\begin{array}{r} {}^{1}\not{2}\,{}^{1}4 \\ -\quad 8 \\ \hline 1\ 6 \end{array}$$

- Can we take 8 ones away?
- Exchange one ten for ten ones.
- Take away 8 ones.
- Can you write this using the column method?

Partitioning

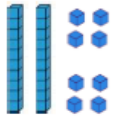
8 ones – 4 ones =
7 tens – 3 tens =
We have ….. tens and ….. ones

34 – 13 =



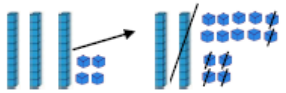
- Partition the number 34.
- Partition 13 and subtract the ones and the tens.
- Place the partitioned number back together.

Subtract 13 from 28

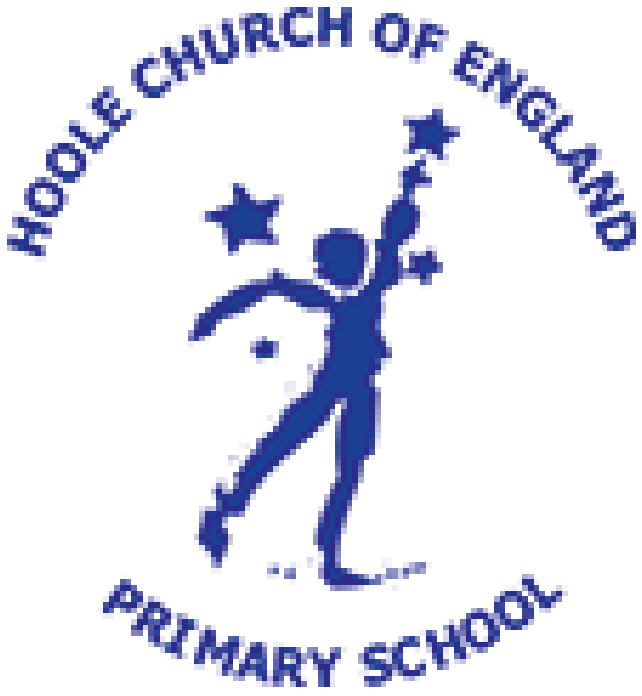


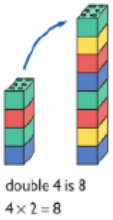
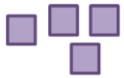
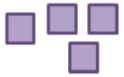
$$\begin{array}{r} 2\ 8 \\ -1\ 3 \\ \hline 1\ 5 \end{array}$$

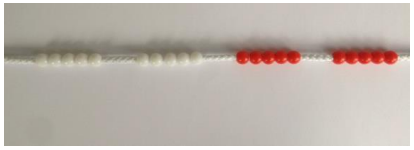
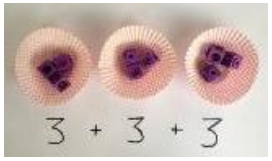
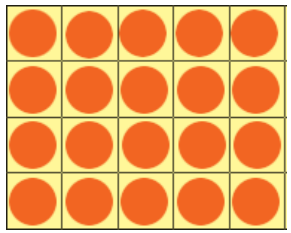
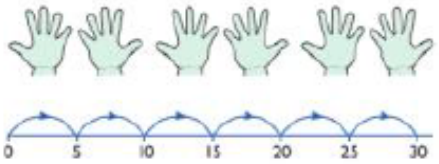
Exchanging

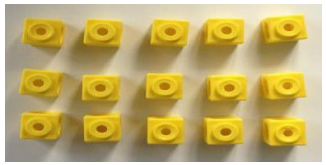
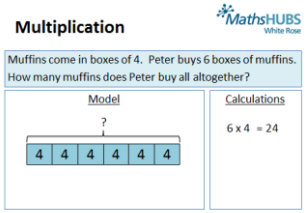
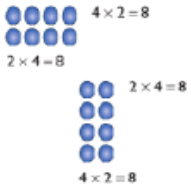
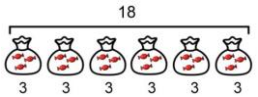
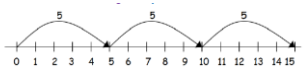
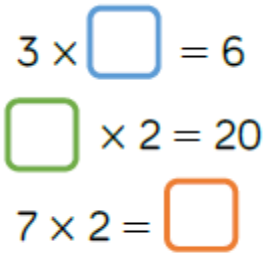
		42 − 15 = 42 40 2 -10 −5 We can't subtract the ones. Can we partition differently? 42 30 12 −10 −5 20 7 Now we can subtract the ones and then subtract the tens. 42 − 15 = 27 Take 16 away from 34  2 13 14 3 4 − 1 6 1 8

Multiplication



EYFS		
Concrete	**Pictorial**	**Abstract**
Children will use a range of counter style resources in order to count on and back from a given number. They will use a range of apparatus to support them to find one more or less than a number. They will use quantites and objects to add and subtract two single digit numbers and count on and back. They solve problems, including doubling, halving and sharing. **Finding double of a number**   Use cubes/counters and other objects to find doubles of numbers. Double 4 is 8   • Tens frames will be used to support children's calculations of doubling a single digit number e.g. 4 + 4 • Part whole model to represent doubling a double • Bead strings to show e.g. double 3.	Children will focus on concrete apparatus to double numbers with teachers modelling written forms through number sentences and where they teachers feel appropriate pictorial representations which represent the concrete form will be used to show doubling. For example: • Part whole model	Teachers will model simple number sentence construction. Reinforce mathematical language so children are able to make links to their learning. The children will continue to use concrete appartus to develop links. 3 + 3 = 6 4 + 4= 8

Year 1		
Concrete	**Pictorial**	**Abstract**
Children solve one step problems using multiplication and division, by calculating the answering using concrete, pictorial representations and arrays. • **Bar model** • **Bead strings**  • **Other concrete apparatus**    **Arrays** using counters/ cubes to show multiplication sentences. 	Although children will not need to directly record, children will be exposed to a range of pictorial representations through teaching opportunities which support the concrete apparatus used: • Bar model • Bead strings to show e.g. double 3. Draw **arrays** to support calculations  Use a **number line** or pictures to continue support in counting in multiples.  Informal jottings  **Stem sentences** 	Teachers will model simple number sentence construction, reinforcing mathematical language to enable children to makes in their learning, alongside the childrens use of concrete appartus to develop links. **Written** addition sentences to describe objects and pictures.  5 x 2 = 10

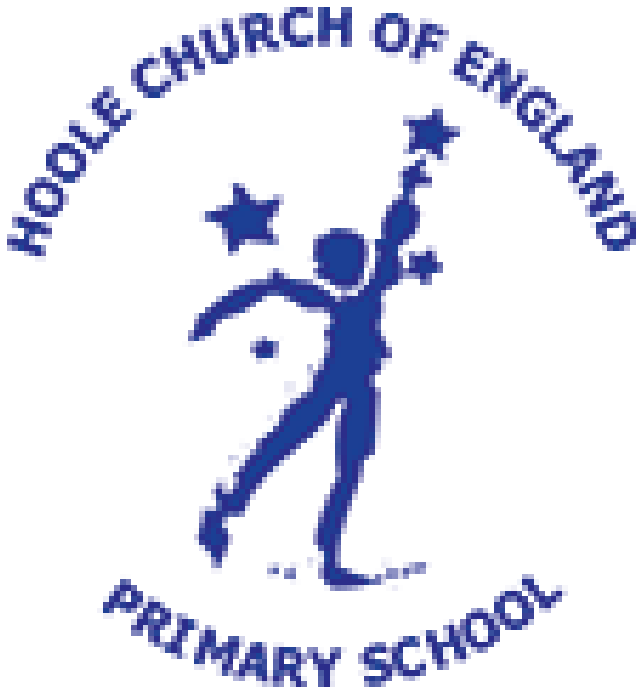
Year 2		
Concrete	**Pictorial**	**Abstract**
Children solve one step problems using multiplication and division, by calculating the answering using concrete, pictorial representations and arrays. • **Bar model** • **Bead strings**  • **Arrays** using counters/ cubes to show multiplication sentences.  	Children will be exposed to a range of pictorial representations through teaching opportunities which support the concrete apparatus used: • **Bar model**  • **Bead strings** to show e.g. double 3. **Arrays** in different rotations to find **commutative** multiplication sentences.  Use a **number line** or pictures to continue support in counting in multiples.   5 + 5 + 5 = 15 **Stem sentences**	Use an **array** to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15 **Missing Number sentences** 

$\square + \square + \square = 18$

$\square \times \square = 18$

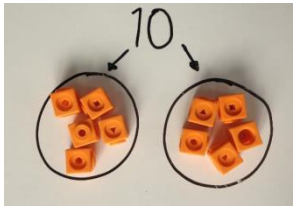
There are __ equal groups with __ in each group.
There are three __.

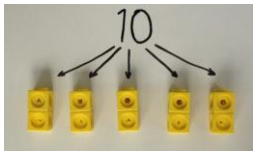
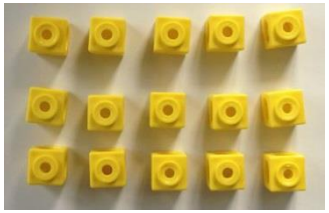
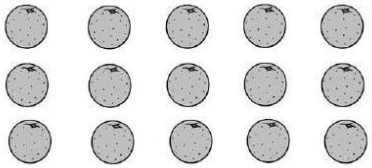
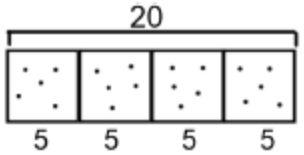
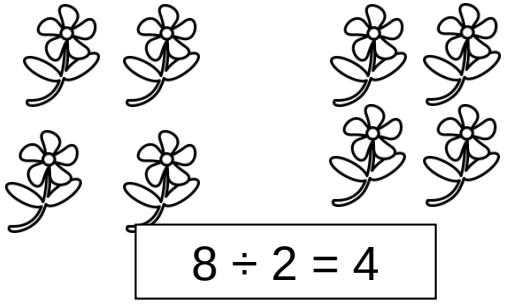
Division

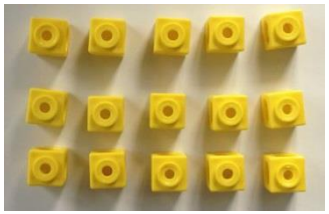
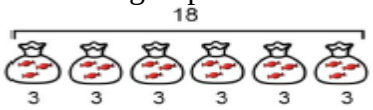
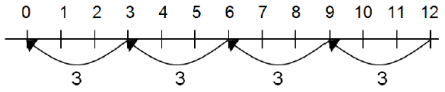
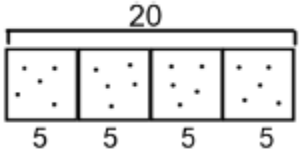
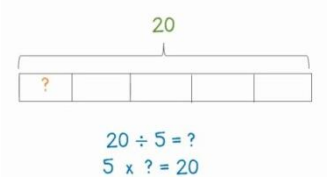


<table>
<tr><th colspan="3">EYFS</th></tr>
<tr><th>Concrete</th><th>Pictorial</th><th>Abstract</th></tr>
<tr><td>Children will use a range of counter style resources in order to count on and back from a given number. They will use a range of apparatus to support them to find one more or less than a number. They will use quantites and objects to add and subtract two single digit numbers and count on and back. They solve problems, including doubling, halving and sharing.

Sharing: using a range of concrete resources.

I have 10 cubes, can you share them equally in 2 groups?
  
  </td><td colspan="2">Children will focus upon sharing practically using a systematic approach.</td></tr>
</table>

Year 1		
Concrete	**Pictorial**	**Abstract**
Children solve one step problems using multiplication and division, by calculating the answering using concrete, pictorial representations and arrays. Using a range of appropriate concrete apparatus which is children divide quantities into equal groups. Use **cubes, counters or objects** to aid understanding.     Link division to multiplication by creating an **array** to embed sharing/grouping. **Bead strings** 	Draw an **array** and use lines to split the array into groups to make multiplication and division sentences  Children use pictures or shapes to share quantities. **Bar model**  **Pictorial repesentations**  	Use **number sentences** to represent a problem. Share 9 buns between three people. 9 ÷ 3 = 3

Year 2		
Concrete	**Pictorial**	**Abstract**
Children solve one step problems using multiplication and division, by calculating the answer using concrete, pictorial representations and arrays.  **Arrays** Link division to multiplication by creating an array and thinking about the number sentences that can be created. 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15 **Grouping** 15 ÷ 3 = 5 	Use a **number line** to show jumps in groups. The number of jumps equals the number of groups.   Think of the **bar model** as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.   **Pictorial images** to support written sentences.	**Written calculations** Find the inverse of multiplication and division sentences by creating four linking number sentences. 7 x 4 = 28 4 x 7 = 28 28 ÷ 7 = 4 28 ÷ 4 = 7

	 □ × □ = □ lots of 3 = □ □ multiplied by □ = 12	