Glastonbury Thorn School

Maths Calculation Policy

EYFS

Children are encouraged to gain a sense of the number system through the use of counting concrete objects, through stories and rhymes and through the use of visual images that they are able to subitise.

Addition

Children are introduced to the concept of addition through combining objects in practical ways and counting all.

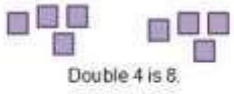
They are encouraged to say what they see when shown a subitising pattern, e.g.' I see 2 and 3, there are 5 altogether.'

Subtraction

Children are introduced to the concept of subtraction through practical games, activities, stories and rhymes. They learn that subtraction means 'taking away' and are encouraged to physically subtract or 'count out' from a group of objects, counting how many remain.

Multiplication

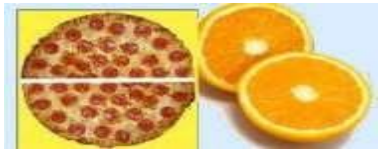
Children are introduced to doubling through real life problems

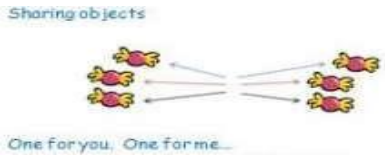


Division

Division is introduced through the language of halving and sharing.

Children are provided with lots of practical activities whereby they halve objects, share objects or place them into groups

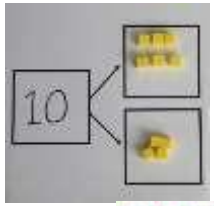
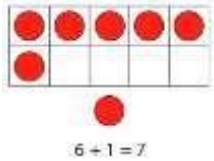
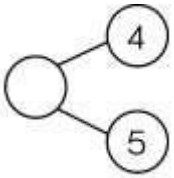
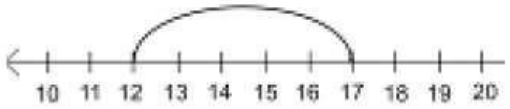




Year 1 and Year 2

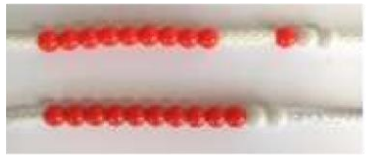
Addition

Key Mathematical Vocabulary: **more, plus, add, altogether, total, sum, double, near double**

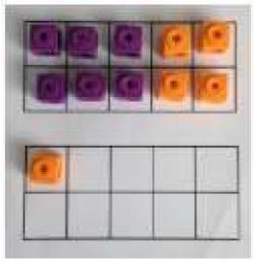
Progression	Concrete	Pictorial	Abstract
Combining two parts to make a whole Counting sets of objects, combining then recounting using a 1:1 correspondence	    Use cubes or counters on a tens frame/part whole model to combine two amounts.	 Use pictures to add two numbers together. Draw a part whole model 	4 + 5 = 9 9= 5 + 4  Use the part-whole diagram as shown above to move into the abstract.
Starting at the bigger number and counting on This is an opportunity to Introduce the commutativity of addition.	4 + 2 Start with the bigger number and count on in ones 	  Start at the bigger number on the number line and count on in ones or in one jump to find the answer	4 + 2 = 6 Place the larger number in your head and count on the smaller number to find your answer.

Regrouping to make 10.

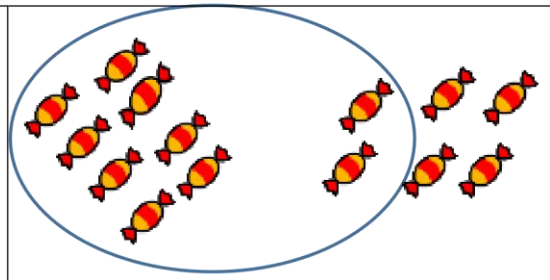
To move on from the previous strategy, rather than counting on, children use their number bond knowledge and bridge to 10 e.g. if 4 + 6 = 10, so 4 + 7 must equal 11



6 + 5 = 11

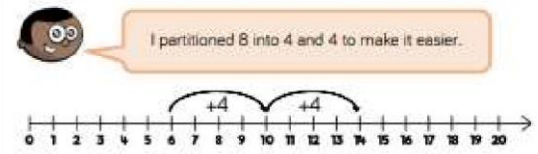


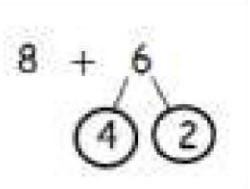
Start with the bigger number and use the smaller number to make 10.



Draw pictures. Partition the smaller number and combine with the greater number to make ten. Then count on the remainder

6 + 8 = Using a number line





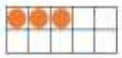
8 + 2 = 10
10 + 4 = 14

Adding three single digits

Use this method as an opportunity to develop fluent recall and application of known number facts including bonds and doubles.

4 + 3 + 6 =

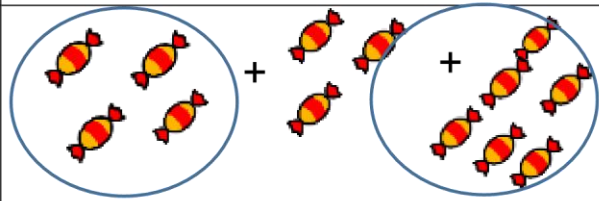
4 + 6 = 10



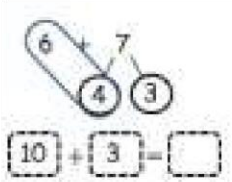
10 + 3 = 13

Rearrange the numbers to find a number bond to 10 first (if possible) and then add on the third digit

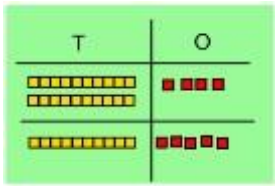
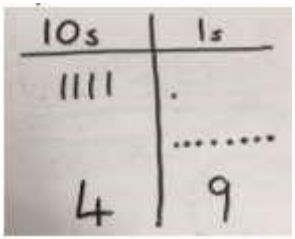
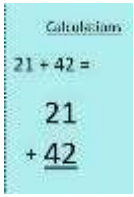
.

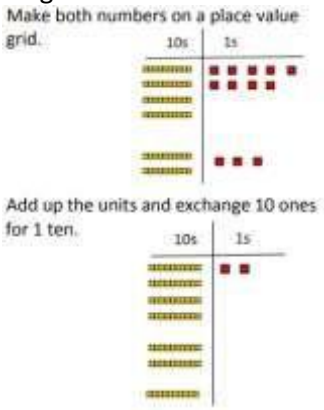
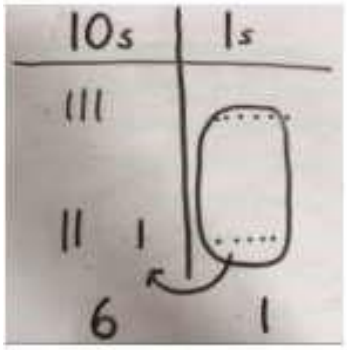


Circle the two groups that make 10 and count on the final group

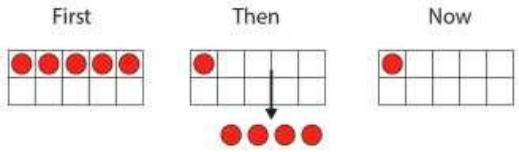
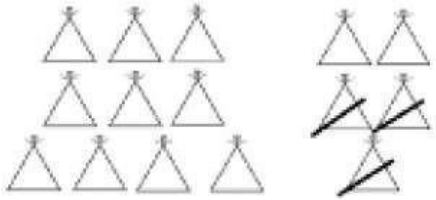


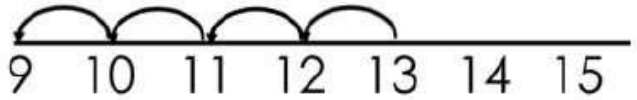
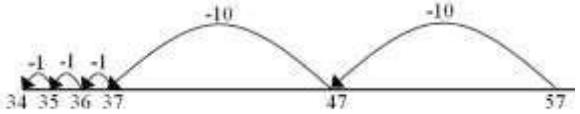
Combine the two numbers that make 10 and then add on the remainder.

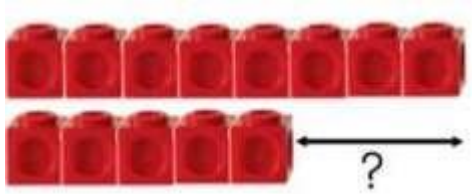
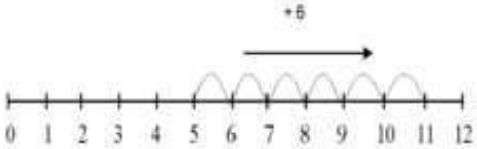
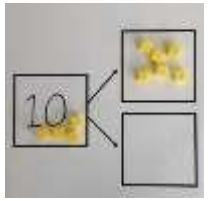
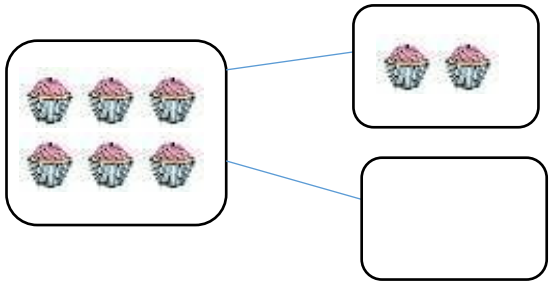
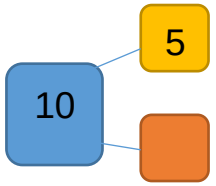
Column method- no regrouping The emphasis for this strategy in KS1 is to develop a deep understanding of place value . In year 2, recording addition and subtraction informally in columns supports place value and prepares for formal written methods with larger numbers later on in KS2	24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks 	After practically using the base 10 blocks, children can draw their own base 10, representing these on a place value chart.  Combine all the ones and all the tens	21 + 42 = 1 one + two ones = 3 ones 2 tens + 4 tens = 6 tens 6 tens and 3 ones = 63 Formal method 

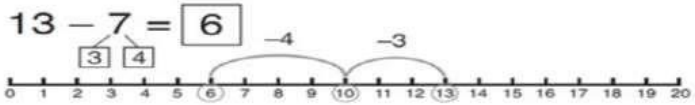
Column method- regrouping	Money, 10p and 1p pieces and can also be used to support this learning 	Children can draw a pictoral representation of the base 10 apparatus on a place value grid 36 + 25  Circle the 10 ones and show exchange by adding an extra 10	36 + 25 30 + 20 = 50 6 + 5 = 11 50 + 11 = 61

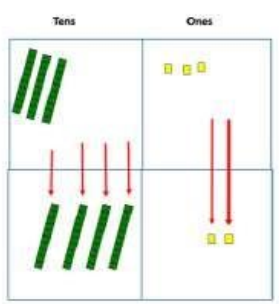
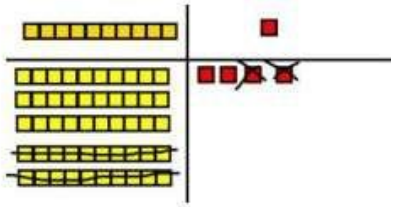
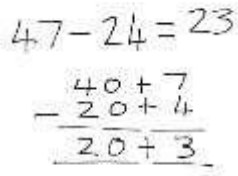
Subtraction **Key Mathematical Vocabulary**: **less than, minus, subtract, take away, difference, fewer, left**

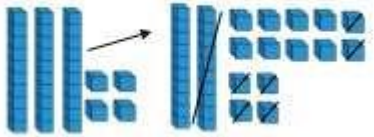
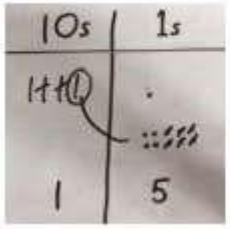
Progression	Concrete	Pictorial	Abstract
Taking away Use physical objects to demonstrate how something can be taken away. Move on to crossing out drawn representations.	Use physical objects, counters, cubes etc to show how objects can be taken away. 4 – 2 = 2  Use tens frames and remove counters 	Cross out drawn objects to show what has been taken away.  15 – 3 = 12	18 -3= 15 8 – 2 = 6

Counting back As with the previous, this strategy is used for subtracting small numbers from larger numbers and provides a good foundation for the concept of subtraction	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones. 13 – 4  Use counters and move them away from the group as you take them away counting backwards as you go. 	Count back on a number line or number track  Start at the bigger number and count back the smaller number showing the jumps on the number line.  This can progress all the way to counting back using two 2 digit numbers.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

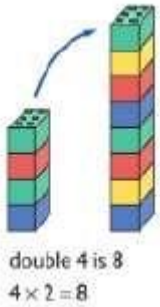
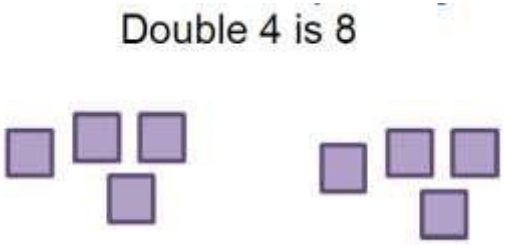
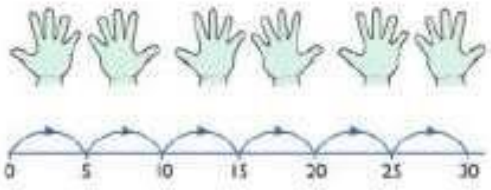
Find the difference Pupils should develop a good understanding of the meaning of 'difference', exploring the inverse relationship with addition by counting back and counting up.	Find the difference between 8 and 5 Use cubes to build towers to find the difference  	 Count on to find the difference.	Hannah has 16 sandwiches, Helen has 12 sandwiches. Find the difference between the number of sandwiches.
Part- Whole Model This model develops knowledge of the inverse relationship between addition and subtraction and is used to find the answer to missing number problems.	 Link to addition- use the part whole model to help explain the inverse between addition and subtraction. If 10 is the whole and 6 is one of the parts. What is the other part? 10 - 6 =	Use a pictorial representation of objects to show the part whole model. 	 Move to using numbers within the part whole model.

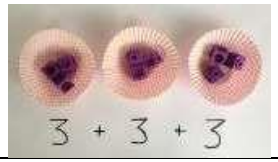
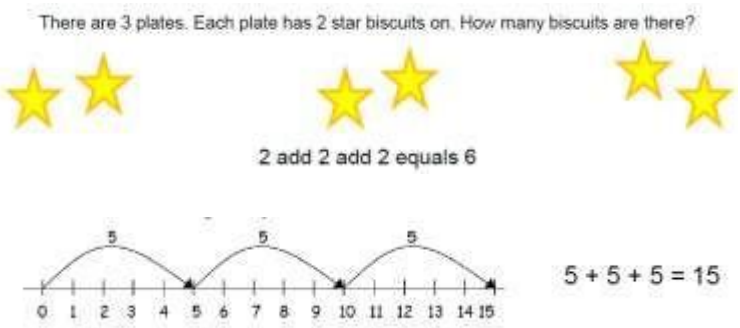
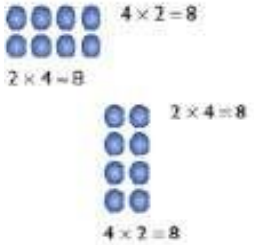
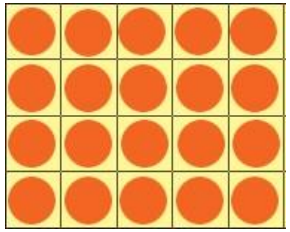
Bridging back through 10 Use this strategy to subtract a single digit number from a 2digit number. Pupils identify how many need to be taken away to make ten first. Then they take away the rest to reach the answer.	14 – 9 =  Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	 Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	16 – 8= How many do we take off to reach the next 10? How many do we have left to take off?

Column method without regrouping The emphasis for this strategy in KS1 is to develop a deep understanding of place value.		Use Base 10 to make the bigger number then take the smaller number away.	Draw the Base 10 and show subtraction by crossing out the relevant ones and tens 65 – 22 = 	Use this before proceeding to the more formal method 

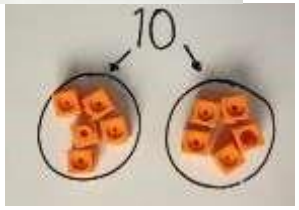
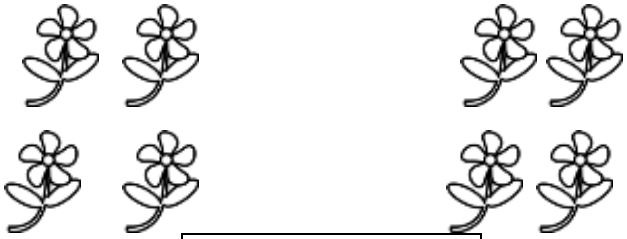
Column method with regrouping The emphasis for this strategy in KS1 is to develop a deep understanding of place value.	Begin by using base ten apparatus 34 – 16 = Take 16 away from 34 	Represent the base 10 pictorially, remembering to show the exchange. 	42-15 42 -10= 32 32- 5 = 27 (may still use a number line for support)

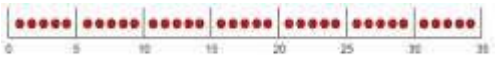
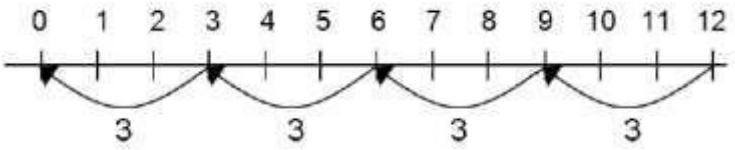
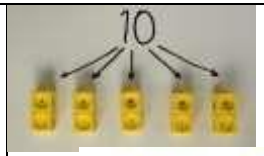
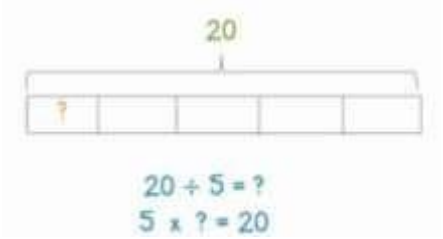
Multiplication – Key Mathematical Vocabulary – **multiply, multiple, multiplied by, times, lots of, double, array, repeated addition**

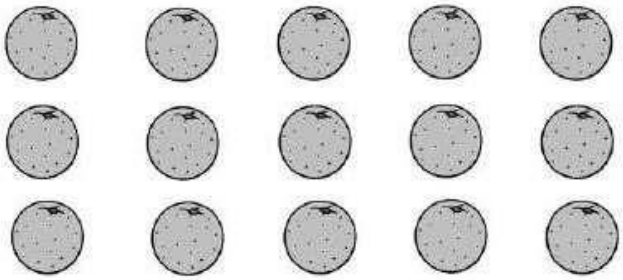
Progression	Concrete	Pictorial	Abstract
Doubling Pupils should be encouraged to develop fluent mental recall of doubles and relate to the 2 x table.	Use practical activities to show how to  double a number.	Draw pictures to show how to double a number.  	4 + 4 = 8 2 x 4 = 8
Counting in multiples Pupils can use their fingers as they are skip counting, to develop an understanding of 'groups of'. Children should become increasingly fluent as they practise.	  Count in multiples supported by concrete objects in equal groups.	 Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

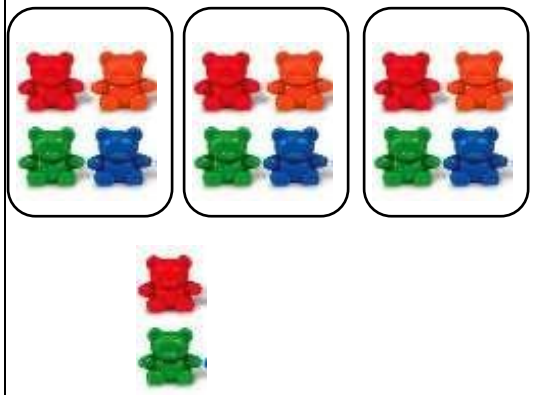
Repeated addition Pupils should apply skip counting to help find the totals of repeated additions.	  Use different objects to add equal groups. 		Write addition sentences to describe objects and pictures. 
Arrays- showing commutative multiplication Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.	Create arrays using counters/ cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences.   Link arrays to area of rectangles.	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

Division – Key Mathematical Vocabulary **divide, share, share between group, equal groups, halve**

Progression	Concrete	Pictorial	Abstract
Sharing Here, division is shown as sharing. E.g. If we have 24 squares of chocolate and we share them between 3 people, each person will have 8 squares each.	 I have 10 cubes, can you share them equally in 2 groups? 	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4	Share 9 buns between three people. 9 ÷ 3 = 3

Division as grouping Here, division is shown as grouping. If we have ten cubes and put them into groups of two, there are 5 groups. This is a	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. 	Use a number line to show jumps in groups. The number of jumps equals the number of groups. 	20 ÷ 5 = 4 Divide 20 into 5 groups. How many are in each group?
good opportunity to demonstrate and reinforce the inverse relationship with multiplication.	 	Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. 	

Division within arrays Use arrays of concrete manipulatives and images of familiar objects to find division equations. Begin to use dot arrays to develop a more abstract concept of division.	 Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg 15 ÷ 3 = 5 5 x 3 = 15 15 ÷ 5 = 3 3 x 5 = 15	Draw an array and use lines to split the array into groups to make multiplication and division sentences. 	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

Division with a remainder This strategy provides an opportunity to reinforce prior learning of odd and even and 'multiples' when exploring how numbers can and cannot be divided into different whole numbers	14 ÷ 3 = Divide objects between groups and see how much is left over 	Draw dots and group them to divide an amount and clearly show a remainder.  	Complete written divisions and show the remainder using r.