SS. Mary and John Catholic Primary School
Calculation Policy
2024 - 2025

This calculation policy is a guide for all staff at SS Mary and John Catholic Primary School.

It has been updated to match the White Rose Scheme of Work.

The calculation policy focuses on the links between, and also the progression through, Concrete, Pictorial and Abstract.

It is designed to be used alongside White Rose and any teaching resources that teachers use in their daily Mathematics lessons.

All staff have access to the schemes of work from White Rose, which include a host of ideas and activities to develop mastery in Mathematics but which should be adapted to support and challenge the pupils in their year group.

September 2024

SS. Mary and John Catholic Primary School
Calculation Policy
2024 - 2025

	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Saying which number is one more than a given number. Finding the total number of items in two groups by counting all of them. Finding the total by starting at the bigger number and counting on.	Combining two parts to make a whole: part whole model. Starting at the bigger number and counting on. Regrouping to make 10.	Adding three single digits. Column method – no regrouping.	Column method – regrouping. (Up to 3 digits)	Column method – regrouping. (Up to 4 digits)	Column method – regrouping. (with more than 4 digits) Decimals – with the same amount of decimal places	Column method – regrouping. Decimals – with the different amounts of decimal places
	Taking away using objects or drawing and crossing out. Saying which number is one less than a given number. Subtracting two single digit numbers by counting back.	Taking away ones. Counting back. Find the difference. Part whole model. Make 10	Counting back. Finding the difference. Part whole model. Make 10. Column method – no regrouping.	Column method – regrouping. (Up to 3 digits)	Column method – regrouping. (Up to 4 digits)	Column method – regrouping. (with more than 4 digits) Decimals – with the same amount of decimal places.	Column method – regrouping. Decimals – with the different amounts of decimal places.
	Problem solving - doubling	Doubling Counting in multiples	Doubling Counting in multiples Repeated addition Arrays – showing commutative multiplication	Counting in multiples Repeated addition Arrays – showing commutative multiplication	Column multiplication (2 and 3 digit multiplied by 1 digit)	Column multiplication (up to 4 digit numbers multiplied by 1 or 2 digits)	Column multiplication (multi digit numbers multiplied by a 2 digit number)
	Problem solving – halving and sharing.	Sharing objects into groups Division as grouping	Division as grouping Division within arrays	Division within arrays Division with a remainder Short Division (2 digits by 1 digit- concrete and pictorial)	Division within arrays Division with a remainder Short Division (up to 3 digits by 1 digit- concrete and pictorial)	Short Division (up to 4 digits by a 1 digit number interpret remainders appropriately for the context)	Short division Long division (up to 4 digits by a 2 digit number interpret remainders as whole numbers, fractions as required)

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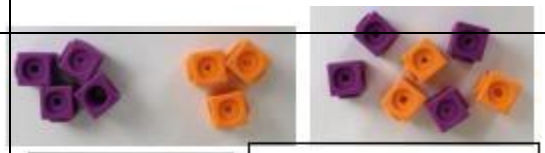
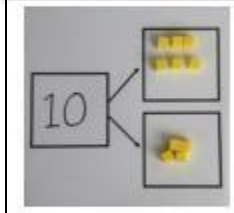
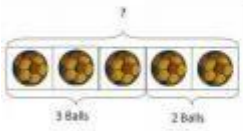
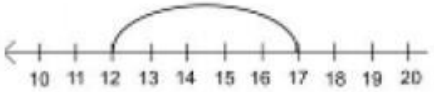
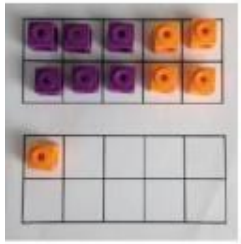
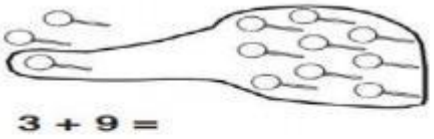
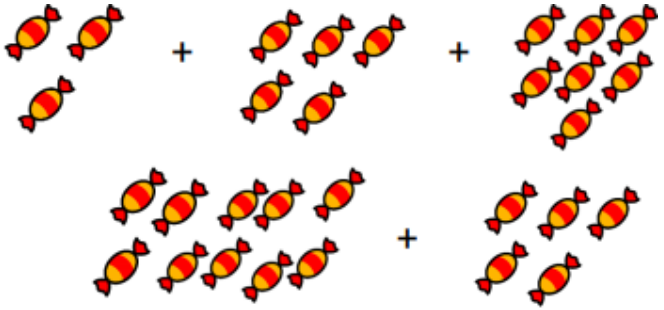
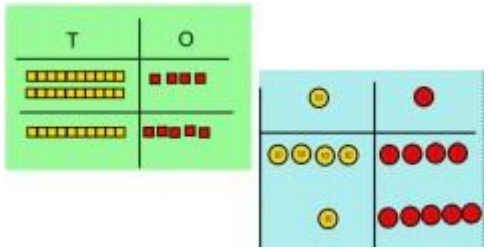
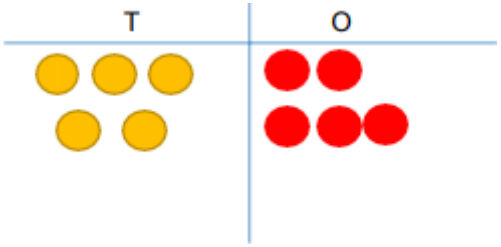
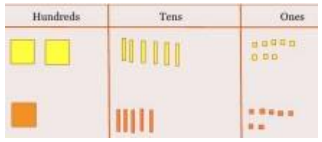
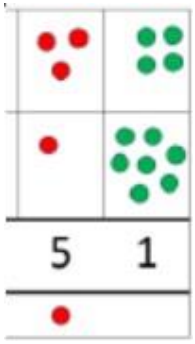
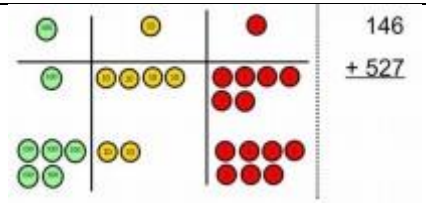
Calculation policy—Addition

Key language: sum, total, parts and whole, plus, add, altogether, more, is equal to, is the same as.

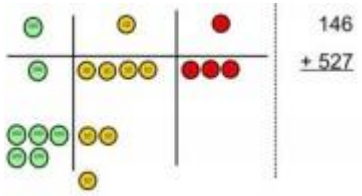
Objectives and strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	  Use cubes to add two numbers together as a group or in a bar. 	  Use pictures to add two numbers together as a group or in a bar. 	4 + 3 = 7 10= 6 + 4  Use the part-part whole diagram as shown above to move into the abstract.
Starting at the bigger number and counting on.	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	12 + 5 = 17  Start at the larger number on the number line and count on in ones or in one jump to find the answer.	5 + 12 = 17 Place the larger number in your head and count on the smaller number to find your answer.

Regrouping to make 10.	 6 + 5 = 11  Start with the bigger number and use the smaller number to make 10.	 3 + 9 = Use pictures or a number line. Regroup or partition the smaller number to make 10. 9 + 5 = 14 1 4 +1 +4 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	7 + 4= 11 If I am at seven, how many more do I need to make 10. How many more do I add on now?
Addingthree single digits.	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.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	4 + 7 + 6 = 10 + 7 10 = 17 Combine the two numbers that make 10 and then add on the remainder.

Column method without regrouping.	Add together the ones first then add the tens. Use the Base 10 equipment first before moving onto place value counters. 24 + 15 = 44 + 15 = 	After practically using the base 10 equipment and place value counters, children can draw the counters using a place value frame to help them to solve additions. 32 + 23 = 	Add the ones first, then the tens, then the hundreds. 2 2 3 + 1 1 4 3 3 7
Column method with regrouping.	This process is to be done with the base 10 equipment to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100. Add, re- group 10 ones for a ten and 10 tens for a hundred.  Progressing to place value counters. Make both numbers on a place value grid.	Children draw a pictorial representation of the place value frame and counters to further support their learning and understanding re-grouping the ten underneath the equals line. 	Start by partitioning the numbers before moving on to formal written methods clearly show the re-grouping. 25 + 48 = 20 + 5 40 + 8 60 + 13 = 73

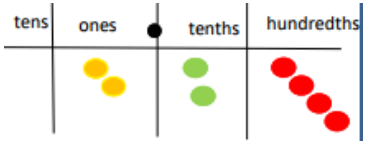


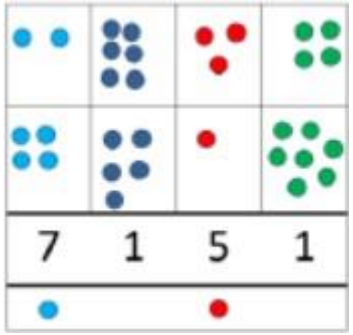
Add up the ones and re-group 10 ones for one 10.



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

As children move on to decimals, money and decimals place value counters can be used to support learning.





Add the ones first, then the tens, then the hundreds.

H T O
536
+ 85
621
1 1

As the children move on, introduce decimals with the same number of decimal places and different places. Money can be used here.

72.8
+54.6
127.4
1 1

£ 2 3 . 5 9
+ £ 7 . 5 5
£ 3 1 . 1 4
1 1 1

81,059
3,668
15,301
+ 20,551
120,579
1 1 1 1

Insert zeros for place holders.

2 3 . 3 6 1
9 . 0 8 0
5 9 . 7 7 0
+ 1 . 3 0 0
9 3 . 5 1 1
2 1 2

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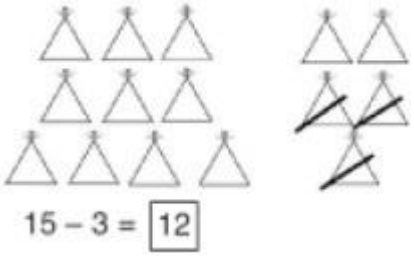
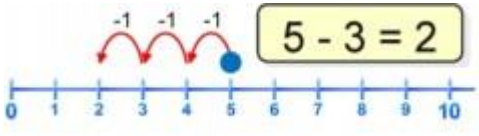
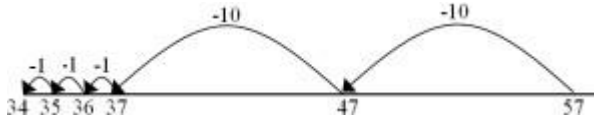
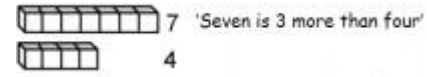
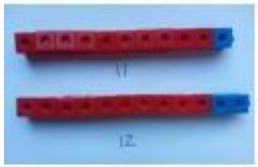
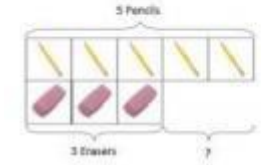
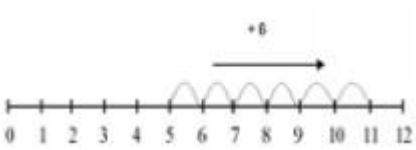
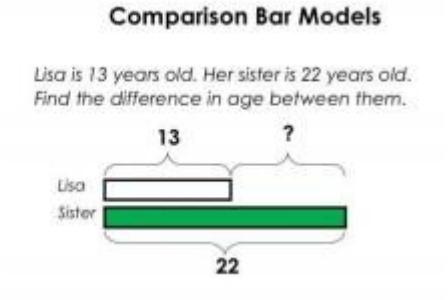
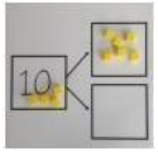
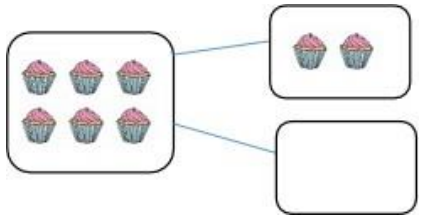
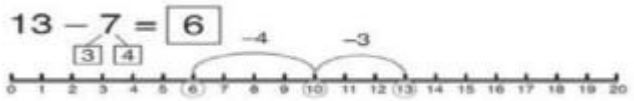
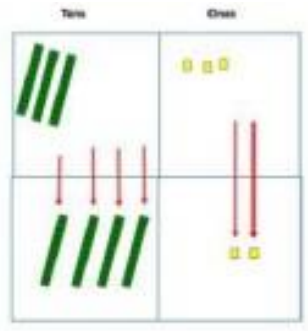
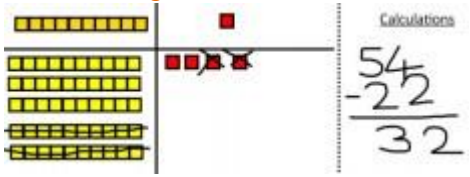
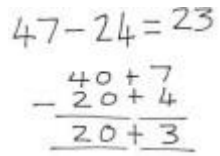
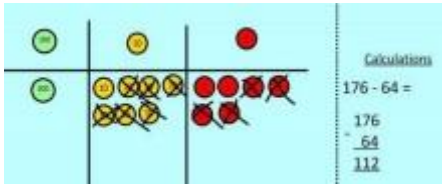
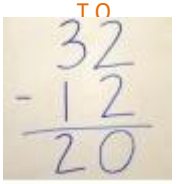
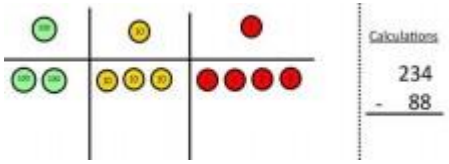
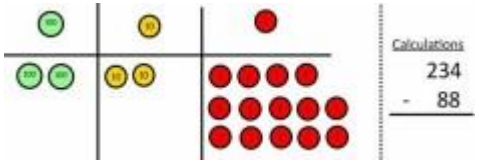
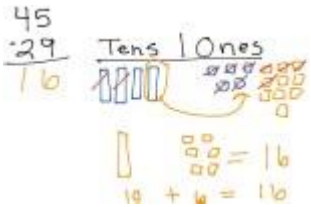
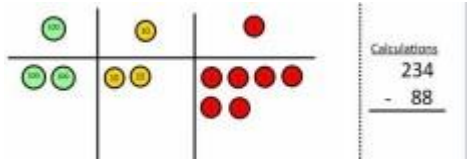
Calculation policy— subtraction
Key language: takeaway, less than, the difference, subtract, minus, fewer, decrease.

Objectivesand strategies	Concrete	Pictorial	Abstract
Taking away ones.	Use physical objects, counters, cubes, etc, to show how objects can be taken away. 6 – 4 = 2 	Cross out drawn objects to show what has been taken away.  	7 – 4 = 3 6 = 8 – 2 18 – 3 = 15
Counting back	Move objects away from the group, counting backwards.  Make the larger number in your subtraction. Move the beads along the bead string as you count backwards in ones. 	Count back in ones using a 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?

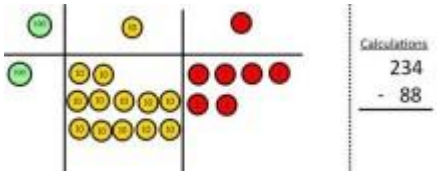
Find the difference	Compare amounts and objects to find the difference.   Use cubes to build towers or make bars to find the difference  Use basic bar models with items to find the difference	Count on using a number line to find the difference.  Draw bars to find the difference between 2 numbers. 	Hannah has 23 sweets, her sister has 15 sweets. Find the difference between the number of sweets. Ben has 12 marbles and his brother has 5. How many more marbles does Ben have than his brother?
Part Whole Model	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. 

Make 10	14 – 5 Make 14 on the ten frame. We will partition the 5. Take away the 4 first to make 10 and then take away 1 more so you have taken away 5. 	Use a number line. 13 – 7 = Start at 13. Partition the 7 into a 3 and a 4 so can take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. 	16 - 8 = Partition the 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	Use the base 10 equipment to make the bigger number then take the smaller number away. 	Draw the Base 10 or place value counters alongside the written calculation to support understanding. 	Intermediate step of partitioning. 

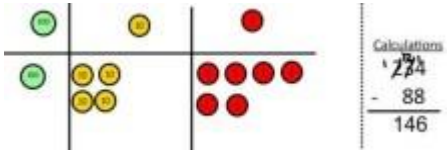
	Show how you partition numbers to subtract. Again make the larger number first. 		This will lead to a clear written column subtraction. 
Column method with regrouping	Use Base 10 to start with before moving onto place value counters. Start with one regrouping before moving onto subtractions with 2 regroupings then onto 3. Make the larger number with the place value counters  Start with the ones, can I take 8 from 4? I need to regroup one of my tens for 10 ones.  Now I can subtract my ones.	Children draw the Base 10 equipment or the place value counters. 	Children can start their formal written method by partitioning the number into clear place value columns. 836 – 254 = 582 H T O 700 800 130 6 - 200 50 4 ---------- 500 80 2 ---------- The children then progress to formal written methods. 728 – 582 H T O 1 6 7 2 8 - 5 8 2 ----------



Now look at the tens, can I take away 8 tens? I need to regroup 1 hundred for 10 tens.



Now I can take away 8 tens and complete my subtraction.



Show how the concrete method links to the written method alongside your workings. Cross out the numbers when regrouping and show where and how we write the new amount.

```
  1 4 6
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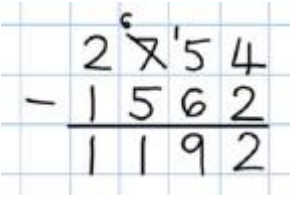
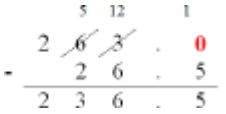
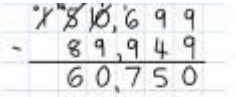
This will lead to subtracting any number

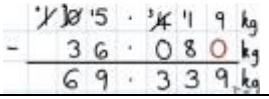


including decimals

Use zeros for place holders



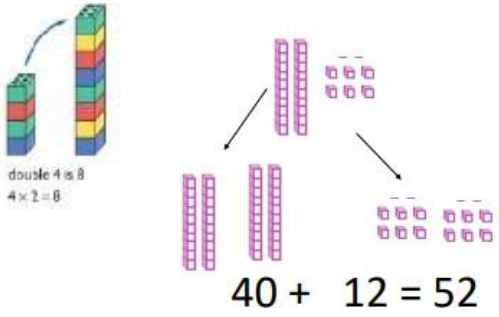
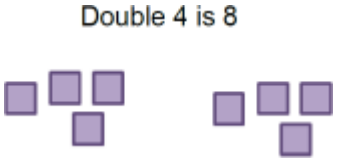
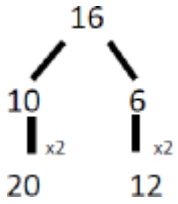


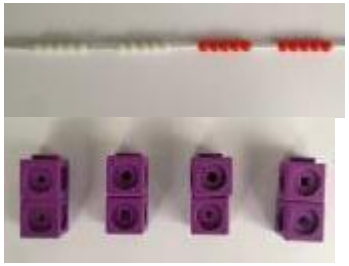
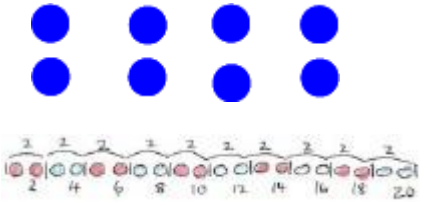
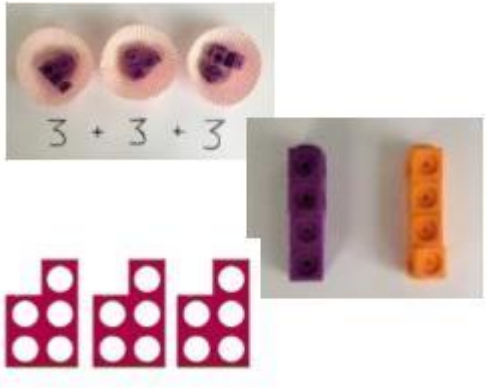
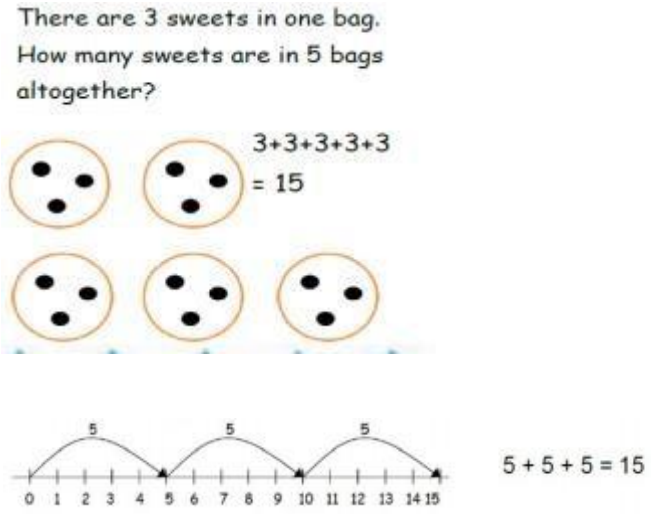


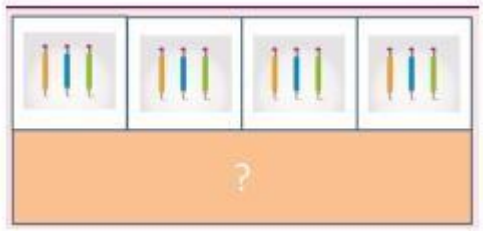
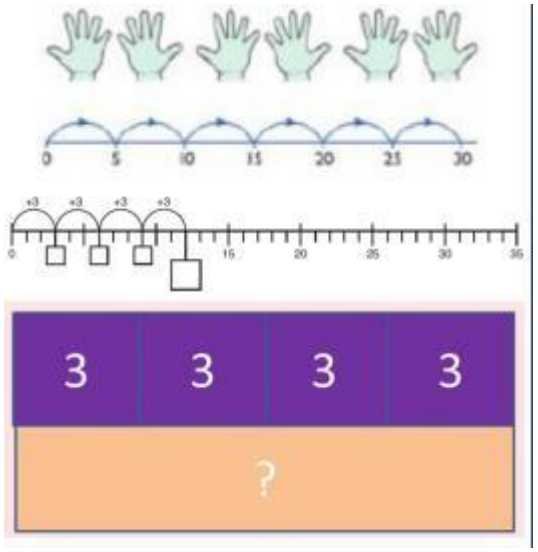
SS. Mary and John Catholic Primary School
Calculation Policy
2024 - 2025

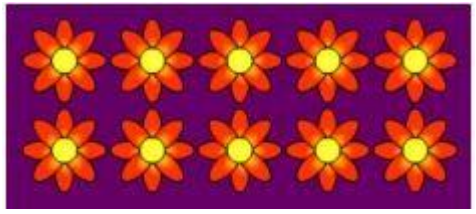
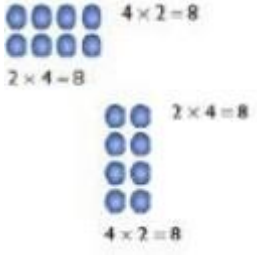
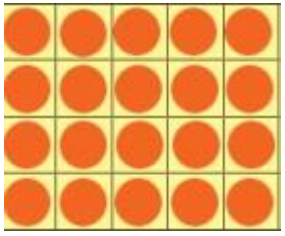
Calculation policy— Multiplication

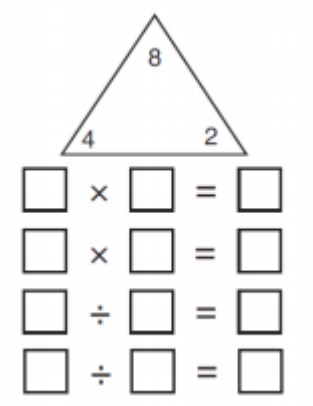
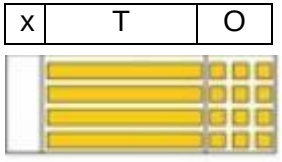
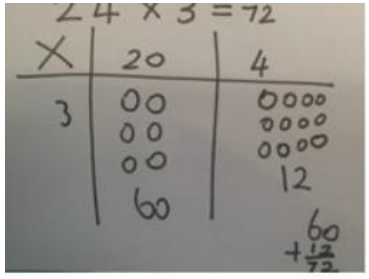
Key language—double, times, multiplied by, the product of, groups of, lots of, equal groups

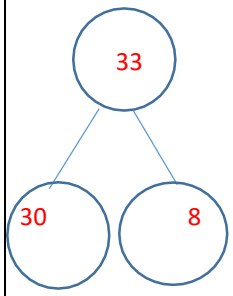
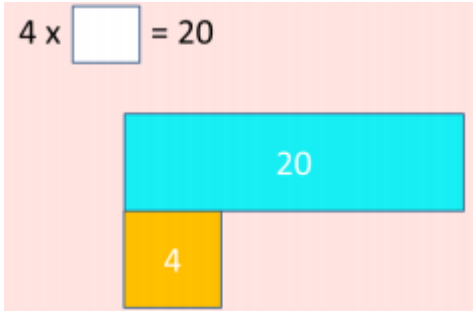
Objectivesand strategies	Concrete	Pictorial	Abstract
Doubling	Use practical activities to show how to double a number. Model doubling using the Base ten equipment: Double 26 = 	Draw pictures to show how to double a number. 	Partition a number and then double each part before recombining it back together. 

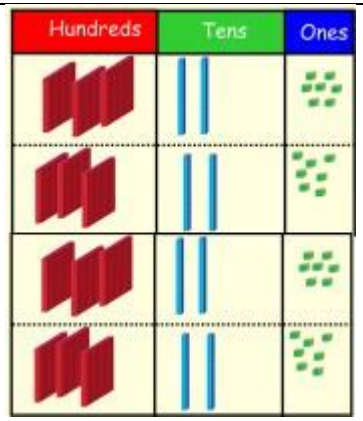
Countingin multiples	Count in multiples supported by concrete objects in equal groups 	Children make representations to show counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30
Repeated addition	Use different objects to add equal groups 	Use pictorial images including number lines to solve problem 	Write addition sentences to describe objects and pictures. 

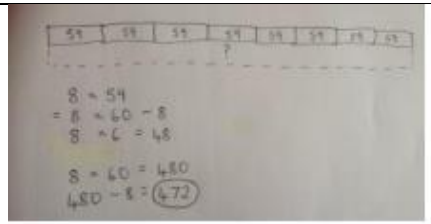
Counting in multiples from 0 (repeated addition)	Count the groups as children skip count. Use bar models.  5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40  	Number lines, counting sticks and bar models should be used to show representation of counting in multiples. 	Count in multiples of a number aloud. Write sequences with multiples of numbers. 0, 2, 4, 6, 8, 10 0, 3, 6, 9, 12, 15 0, 5, 10, 15, 20, 25 , 30 $4 \times 3 = \square$

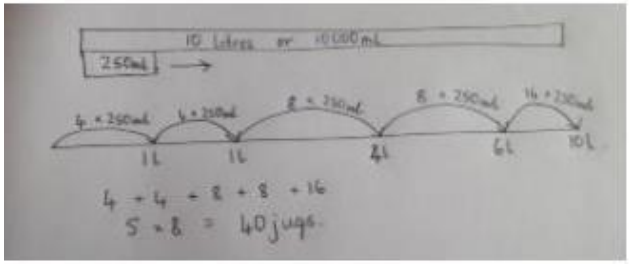
Arrays showing commutative multiplication	Create arrays using counters/cubes to show multiplication sentences   And find answers to 2 lots of 5, 3 lots of 2 etc.  Pupils should understand that an array can represent different equations and that, as multiplication is commutative, the order of the multiplication does not affect the answer.  	Draw arrays in different rotations to find commutative multiplication sentences  Link arrays to areas 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

Using the inverse. This should be taught alongside division so pupils learn how they work alongside each other.	Use cubes or counters to show a multiplication fact and the related division fact. 		Show all 8 related fact family sentences. 2 x 4 = 8 4 x 2 = 8 8 ÷ 2 = 4 8 ÷ 4 = 2 8 = 2 x 4 8 = 4 x 2 2 = 8 ÷ 4 4 = 8÷ 2
Partitioning	Use base ten to move towards a more compact method. 13 x 4 = 	Children can represent their work with place value counters in a way that they understand. They can draw the counters using colours to show different amounts or just use the circles in the different columns to show their thinking: 	Children use partitioning and use the multiplication facts that they know to help them by making numbers 10 x smaller to multiply then make them 10 x bigger in the answer. 33 x 8 = 30 x 8 = 240 3 x 8 = 24 240 + 24 = 264

		Draw part whole models  Bar models are used to explore missing numbers  	
Column multiplication	Children continue to be supported by base ten equipment. This is initially done where there is no regrouping ie 321 x 2 = Progressing to re-grouping always multiply the ones column first. The corresponding long multiplication is modelled alongside.	Bar models and number lines can support learners when solving problems with multiplication alongside the formal written methods.	Start with long multiplication, reminding children about lining up their numbers clearly in columns. Initially, Children to write out what they are solving next to their answer to help them understand the process.

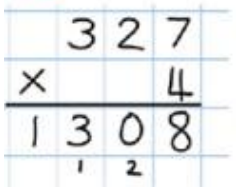




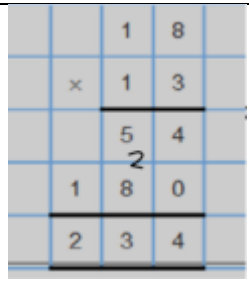
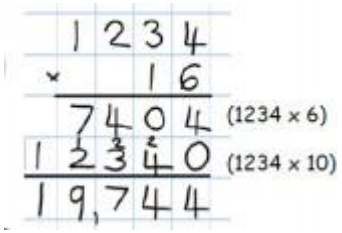
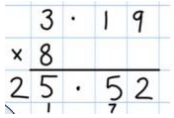


32
x 24
8 (4 x 2)
120 (4 x 30)
40 (20 x 2)
600 (20 x 30)
768

327
x 4
28
80
1200
1308

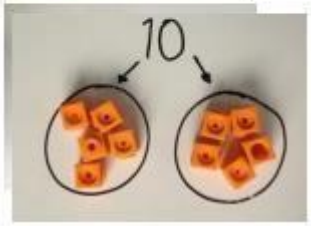
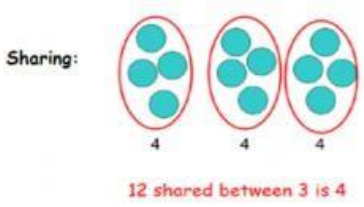
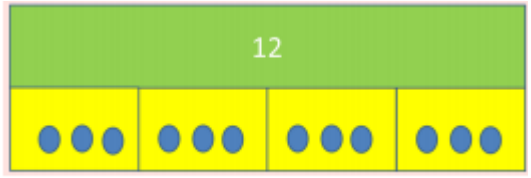


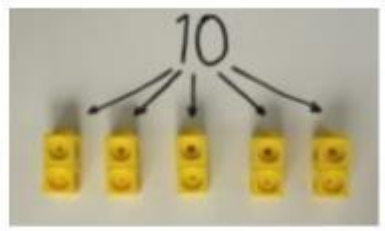
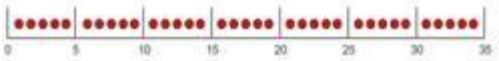
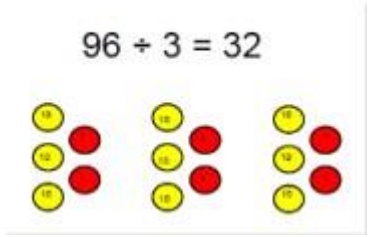
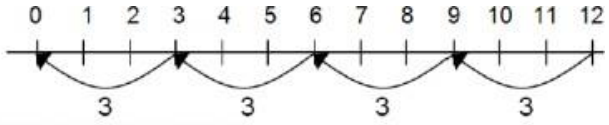
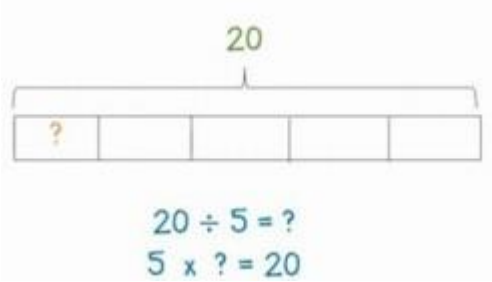
This may lead to a compact method.

			  Multiplying decimals up to 2 decimal places by a single digit: Remind children that the single digit belongs to the ones column. Line up the decimal points in the question and the answer. 

SS. Mary and John Catholic Primary School
Calculation Policy
2024 - 2025

Calculation policy— Division
Key language— share, group, divide, divided by, half

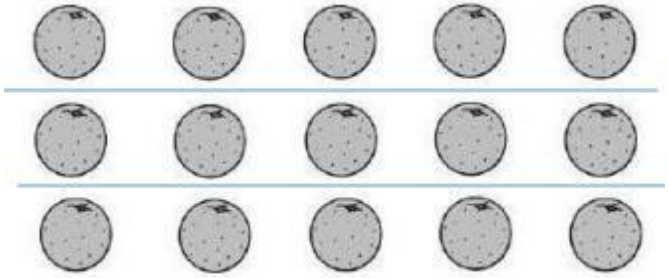
Objectivesand strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	I have 10 cubes, can you share them equally into 2 groups?  	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4  Children use bar modelling to show and support understanding.  12 ÷ 4 = 3	Share 9 sweets between 3 children 9 ÷ 3 = 3

Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.   Use the Base Ten equipment or place value counters: 24 divided into groups of 6 = 4  	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  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.  	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?

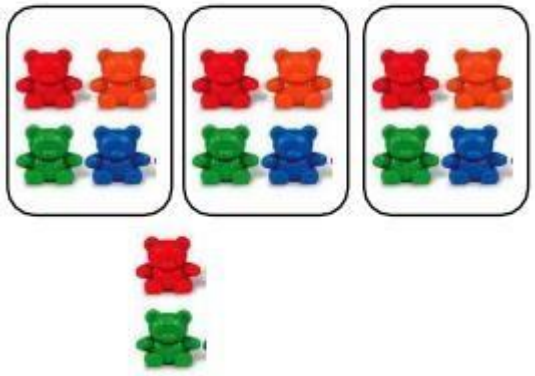
<table>
<tr>
<td>Division with arrays.</td>
<td>Link division to multiplication by creating an array and thinking about the number sentences that can be created.

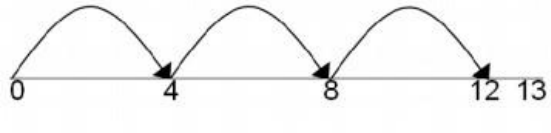
 

Eg 15 ÷ 3 = 5 5 x 3 = 15
15 ÷ 5 = 3 3 x 5 = 15</td>
<td>Draw an array and use lines to split the array into groups to make multiplication and division sentences.

  </td>
<td>Find the inverse of multiplication and division sentences by creating four linking family number sentences.

7 x 4 = 28
4 x 7 = 28
28 ÷ 7 = 4
28 ÷ 4 = 7</td>
</tr>
<tr>
<td>Division with a remainder</td>
<td>14 ÷ 3 =
Divide objects between groups and see how much is left over

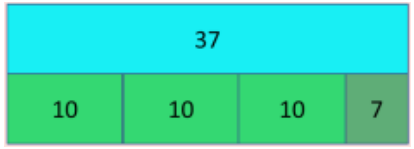
  </td>
<td>Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.

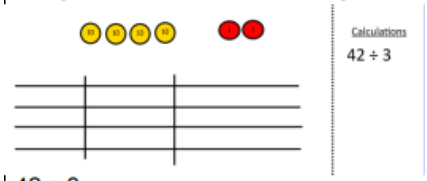
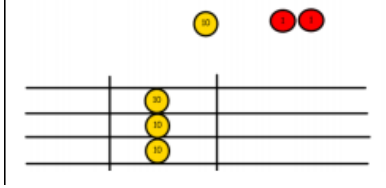
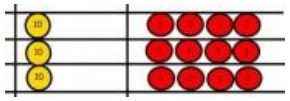
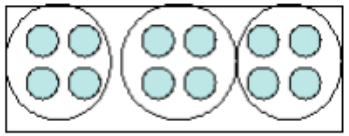
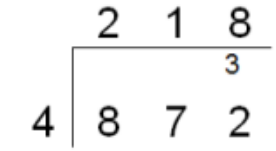
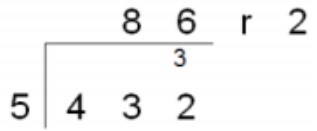
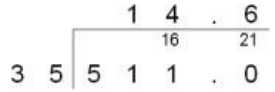
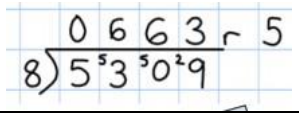
Draw dots and group them to divide an amount and clearly show a remainder.

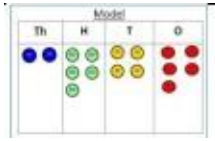
Use bar models to show division with remainders.

 
</td>
<td>Complete written divisions and show the remainder using r.

 
</td>
</tr>
</table>

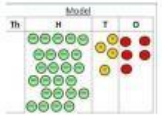
Short division	 Use place value counters to divide using the bus stop method alongside  42 ÷ 3= Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over.  We regroup this ten for ten ones and then share the ones equally among the groups.  We look how much is in 1 group so the answer in 14.	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.  Encourage them to move towards counting in multiples to divide more efficiently.	Begin with divisions that divide equally with no remainder.  Move onto divisions with a remainder.  Move onto divisions with remainders expressed as fractions. Finally move into decimal places to divide the total accurately for appropriate contexts.  

Long division



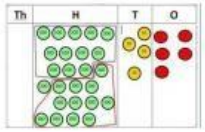
2544 ÷ 12
How many groups of 12 thousands do we have?
None

Regroup 2 thousands for 20 hundreds.



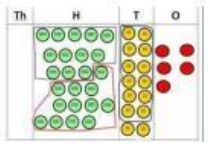
$$12\overline{)2544}\quad 0$$

How many groups of 12 are in 25 hundreds? 2 groups. Circle them.
We have grouped 24 hundreds so can take them off and we are left with one.



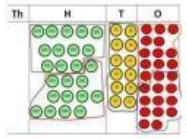
$$12\overline{)2544}\quad 02,\ 24,\ 1$$

Regroup the 1 hundred for 10 tens so now we have 14 tens. How many groups of 12 are there in 14? 1 remainder 2.



$$12\overline{)2544}\quad 021,\ 24,\ 14,\ 12,\ 2$$

Regroup the 2 tens for 20 ones so now we have 24 ones. How many groups of 12 are there in 24?



$$12\overline{)2544}\quad 0212,\ 24,\ 14,\ 12,\ 24,\ 24,\ 0$$

Instead of using physical counters, students can draw the counters and circle the groups on a whiteboard or in their books.

Use this method to explain what is happening and as soon as they have understood what move on to the abstract method as this can be a time consuming process.

$$20\overline{)6365}\quad 0318\ r5$$

-60 ↓
36
-20 ↓
165
-160
5

Express remainders as fractions

Express remainders as decimals

432 ÷ 15 becomes

$$15\overline{)432.0}\quad 28.8$$

30 ↓
132
120 ↓
120
120
0

Answer: 28·8