Meadow Farm Community Primary School
Maths Calculation Policy
Progression in Calculations from EYFS to 6

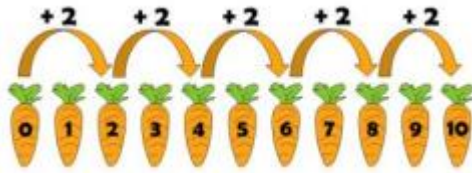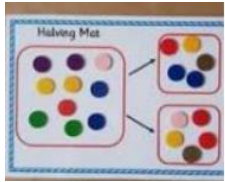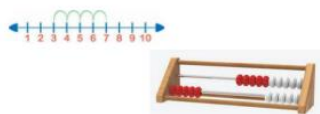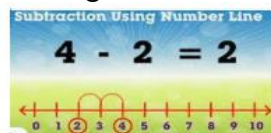| EYFS Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers (Statutory Framework 2021)			
Addition	Subtraction	Multiplication	Division
Children are encouraged to gain a sense of the number system through the use of counting concrete objects.	Children are encouraged to gain a sense of the number system through the use of counting concrete objects.	Children use concrete objects to make and count equal groups of objects.	Children use concrete objects to count and share equally into 2 groups.
They combine objects in practical ways and count all.	They understand subtraction as counting out.	They will count on in twos using a bead string and number line	They count a set of objects and halve them by making two equal groups.

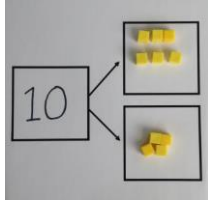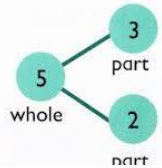|			
They understand addition as counting on. They will count on in ones and twos using objects, cubes, bead string and number line. 	They begin to count back in ones and twos using objects, cubes, bead string and number line. 	They understand doubling as repeated addition. 2 + 2 = 4 	They understand sharing and halving as dividing by 2.
They begin to use + and = They are encouraged to develop a mental picture of the number system in their heads to use for calculations. Higher attaining children may be able to represent their calculations using symbols and numbers within a written calculation. 	They use concrete and pictorial representation to record their calculations. They begin to use - and = Higher attaining children may be able to represent their calculations using symbols and numbers within a written calculation. 	They use concrete and pictorial representation to record their calculations. 	They use concrete and pictorial representation to record their calculations.
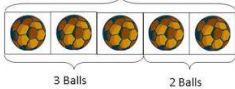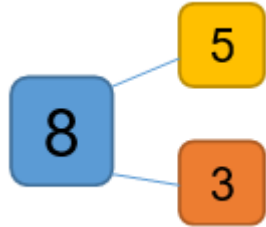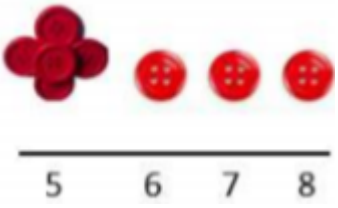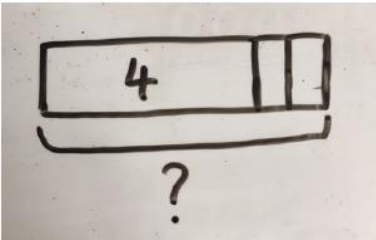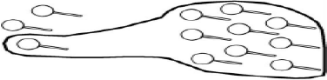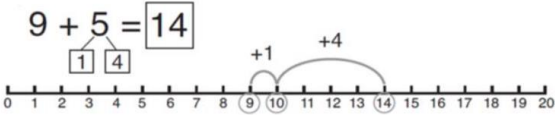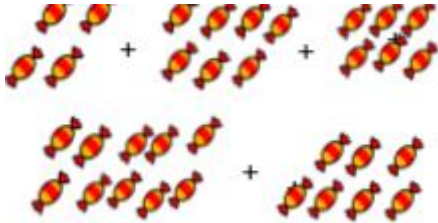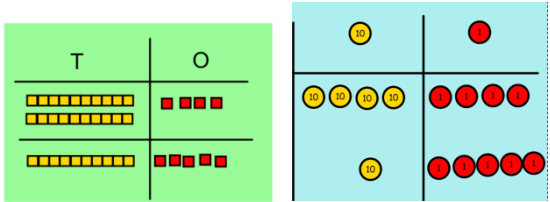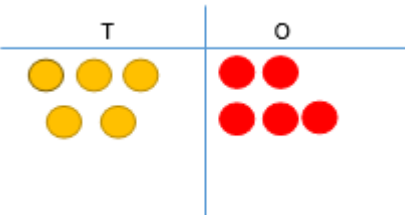
Calculation Guidance: Addition				
Key language: sum, total, parts and wholes, plus, add altogether, more, 'is equal to', 'is the same as'.				
	Objective	Concrete	Pictorial	Abstract
Year 1	Number bonds of 5,6,7,8,9 and 10	Use cubes and numicon to add two numbers as a group or in a bar.	Use picture to add two numbers together as a group or in a bar.	Use the part-part whole diagram as shown above to move into the abstract.

	Counting	Start with larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	A bar model which encourages the children to count on, rather than count all.	The abstract number line: What is 3 more than 5? What is the sum of 3 and 5? What is the total of 4 and 2? 4 + 2
Year 1	**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 9 + 5 = 14 10.	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?

Year 2	**Adding 2 single digit 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.	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 with regrouping	24 + 15= Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters. T O	After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve T O additions.	40 + 9 20 + 3 60 + 12 = 72

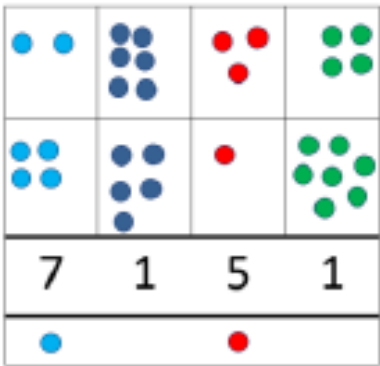|				
Year 3/4	**Column method with regrouping**	Make both numbers on a place value grid. 146 + 527 Add up the units and exchange 10 ones for one 10. 146 + 527 Add up the rest of the columns, exchanging the 10 counters from one column for the next place value column until every column has been added. This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100. As children move on to decimals, money and decimal place value counters can be used to support learning.	7 1 5 1 Children can draw a pictoral representation of the columns and place value counters to further support their learning and understanding.	Start by partitioning the numbers before moving on to clearly show the exchange below the addition. $20 + 5$ $40 + 8$ $60 + 13 = 73$ As the children move on, introduce decimals with the same number of decimal places and different. Money can be used here. $$536$$ $$+\ 85$$ $$621$$ $$1\ 1$$ $$\begin{array}{ccccccc} 2 & 3 & . & 3 & 6 & 1 \\ & 9 & . & 0 & 8 & 0 \\ 5 & 9 & . & 7 & 7 & 0 \\ + & 1 & . & 3 & 0 & 0 \\ \hline 9 & 3 & . & 5 & 1 & 1 \\ 2 & 1 & & 2 \end{array}$$ 72.8 + 54.6 127.4 1 1 $$\begin{array}{ccccc} £ & 2 & 3 & . & 5 & 9 \\ + & £ & & 7 & . & 5 & 5 \\ \hline £ & 3 & 1 & . & 1 & 4 \\ & 1 & 1 & & 1 \end{array}$$
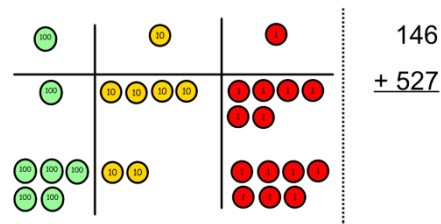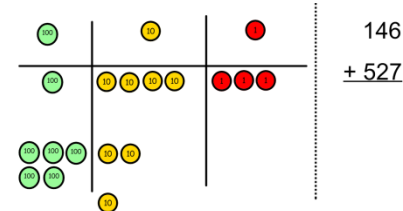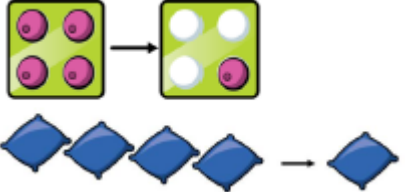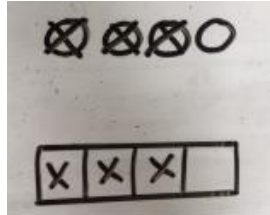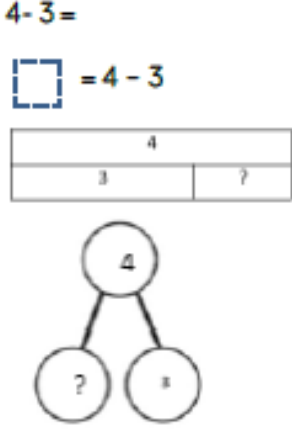
Year 5/6	Column method with regroup	Consolidate understanding using numbers with more than 4 digits and extend by adding numbers with up to 3 decimal places.

Calculation Guidance: Subtraction				
		Key vocabulary: take away, less than, the difference, subtract, minus, fewer, decrease.		
	Objective	Concrete	Pictorial	Abstract
Year 1	Taking away one	Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used). 4 – 3 = 1	Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.	4-3=

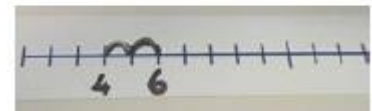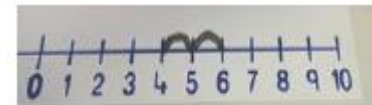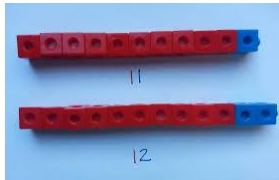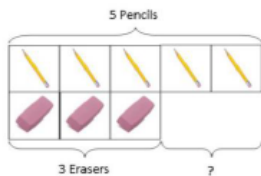|		Make the larger number in your subtraction. Move the beads along your bead string as you count	Children to represent what they see pictorially e.g.	Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line
Year 1	**Counting back**	backwards in ones. 13 – 4 Use counters and move them away from the group as you take them away counting backwards as you go. 6-2		Put 13 in your head, count back 4. What number are you at? Use your fingers to help.
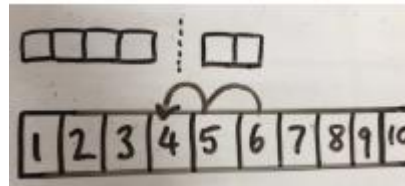
|				
	Find the difference	Compare amounts and objects to find the difference Use cubes to build towers or make bars to find the difference. 5 Pencils 3 Erasers ? Use basic bar models with items to find the difference.	Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate. 	Find the difference between 8 and 5. 8 – 5, the difference is Children to explore why 9-6 = 8 5 = 7-4 have the same difference.
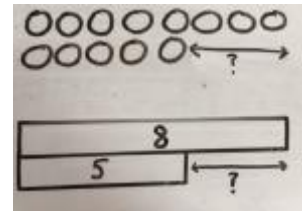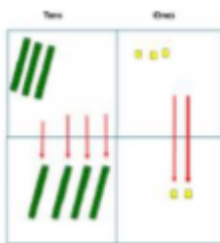
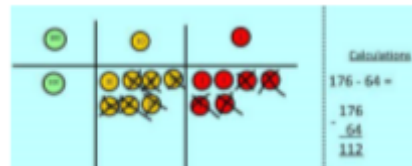| Year 2 | Column method without regrouping | 75 – 42 = 33 Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first. | Draw the Base 10 or place value counters alongside the written calculation to help to show working. | 47 – 24 = 23 This will lead to a clear written column subtraction |

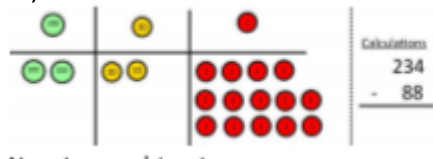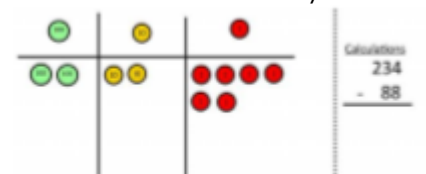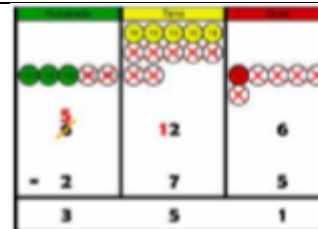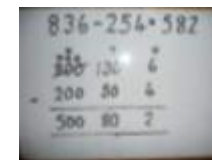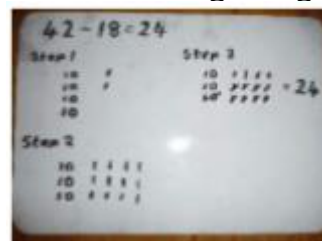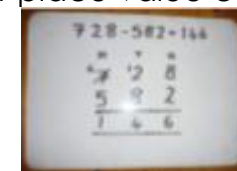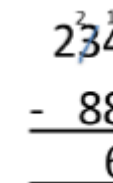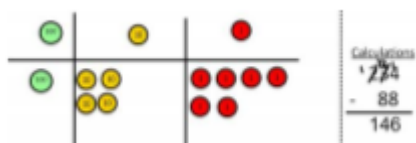|				
Year 3 and above	**Column method with regrouping**	Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges. Make the larger number with the place value counters Start with the ones, can I take away 8 from 4 easily? I need to exchange 1 of my tens for 10 ones. Now I can subtract my ones. Now look at the tens, can I take away 8 tens easily? I need to exchange 1 hundred for 10 tens.	 Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make. When confident, children can find their own way to record the exchange/regrouping. Just writing the numbers as shown here shows that the child understands the method and knows when to exchange/regroup. 	 Children can start their formal written method by partitioning the number into clear place value columns. Moving forward the children use a more compact method. Formal column method. Children must understand what has happened when they have crossed out digits. This will lead to an understanding of subtracting
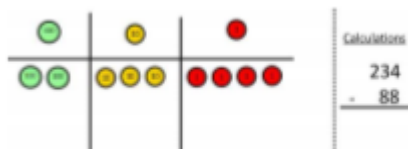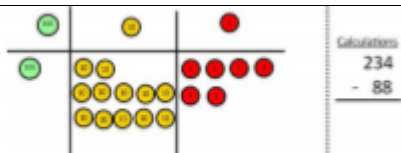
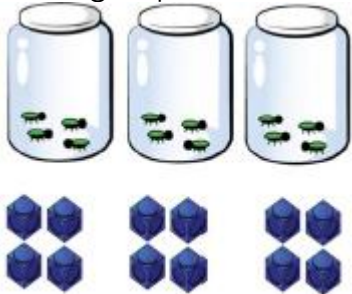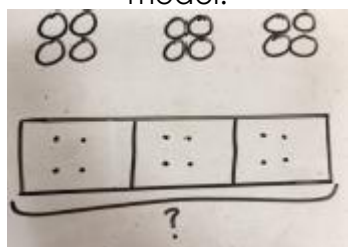|				
		Calculations 234 − 88 Now I can take away 8 tens and complete my subtraction. Calculations 234 − 88 146 Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.		any number including decimals. 5 12 1 2 6 3 . 0 − 2 6 . 5 2 3 6 . 5

Calculation Guidance: Multiplication				
Key vocabulary: double, times, multiplied by, the product of, groups of, lots of, equal groups				
	Objective	**Concrete**	**Pictorial**	**Abstract**
Year 1 and 2	**Repeated addition**	Repeated grouping/repeated addition 3 × 4 4 + 4 + 4 There are 3 equal groups, with 4 in each group. 	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? Children to represent the practical resources in a picture and use a bar model. 	Write addition sentences to describe objects and pictures. 2 + 2 + 2 = 6

Arrays- showing commutative multiplication

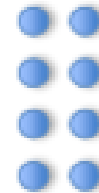Create arrays using counters/cubes to show multiplication sentences.

Draw arrays in different rotations to find commutative multiplication sentences.

4 × 2 =8

2 × 4 = 8

2 × 4 = 8

4 × 2 = 8

Link arrays to area of rectangles.

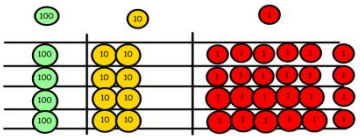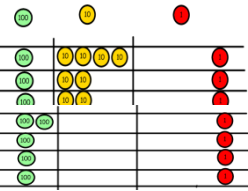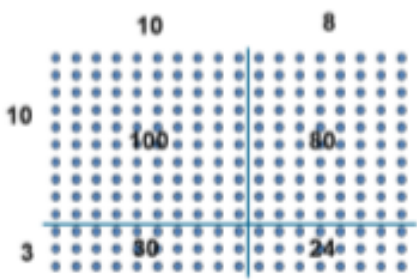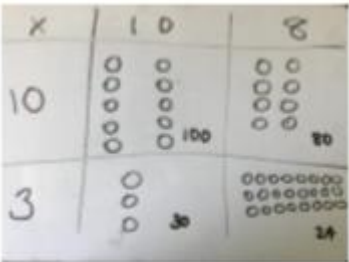**Use an array to write multiplication sentences and reinforce repeated addition.**
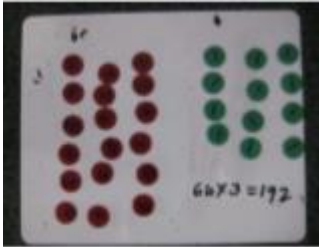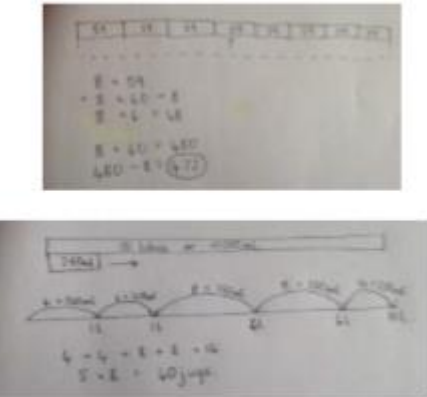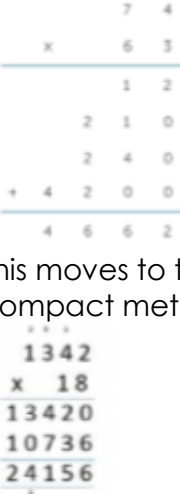
5 + 5 + 5 = 15

3 + 3 + 3 + 3 + 3 = 15

5 x 3 = 15

3 x 5 = 15

Year 3/4	Grid method	Show the link with arrays to first introduce the grid method. 4 rows of 10 4 rows of 3 Move on to using Base 10 to move towards a more compact method. 4 rows of 13 Move on to place value counters to show how we are finding groups of a number. We are multiplying by 4 so we need 4 rows. Calculations 4 x 126 Fill each row with 126.	Children can represent the work they have done with place value counters in a way that they understand. They can draw the counters, using colours to show different amounts or just use circles in the different columns to show their thinking as shown below.	Start with multiplying by one digit numbers and showing the clear addition alongside the grid. | ×	30	5
7	210	35 | 210 + 35 = 245 Moving forward, multiply by a 2 digit number showing the different rows within the grid method.

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Calculations
4 x 126

Add up each column, starting with the ones making any exchanges needed.

Then you have your answer.

</td><td></td><td></td></tr>
<tr><td>**Year 3 and 4**</td><td>**Expanded method**</td><td>

Show the link with arrays to first introduce the expanded method.

</td><td>

</td><td>

Start with long multiplication, reminding the children about lining up their numbers clearly in columns.

```
    18
x  13
   24  (3 x 8)
   30  (3 x 10))
   80  (10 x 8)
  100  (10 x 10)
  234
```

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Year 5/6	**Compact method**	Children can continue to be supported by place value counters at the stage of multiplication. It is important at this stage that they always multiply the ones first and note down their answer followed by the tens which they note below.	Bar modelling and number lines can support learners when solving problems with multiplication alongside the formal written methods. 	Start with long multiplication, reminding the children about lining up their numbers clearly in columns. If it helps, children can write out what they are solving next to their answer. This moves to the more compact method. 1342 x 18 13420 10736 24156

	Calculation Guidance: Division			
	Key vocabulary: share, group, divide, divide by, half.			
	Objective	Concrete	Pictorial	Abstract
Year 1 and 2	Sharing	I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities. $8 \div 2 = 4$	Share 9 buns between three people. $9 \div 3 = 3$

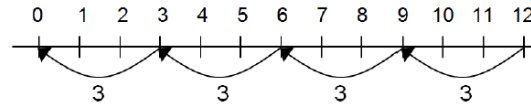|				
Grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. $96 \div 3 = 32$	Use a number line to show jumps in groups. The number of jumps equals the number of groups. Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. $20 \div 5 = ?$ $5 \times ? = 20$	$28 \div 7 = 4$ Divide 28 into 7 groups. How many are in each group?	
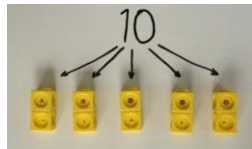
| Year 3/4 | Division with arrays | Link division to multiplication by creating an array and thinking about the number sentences that can be created.

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 |

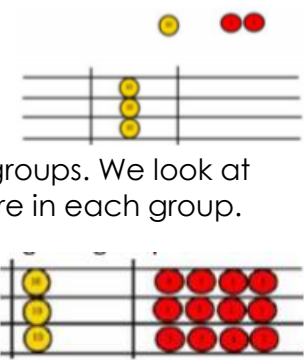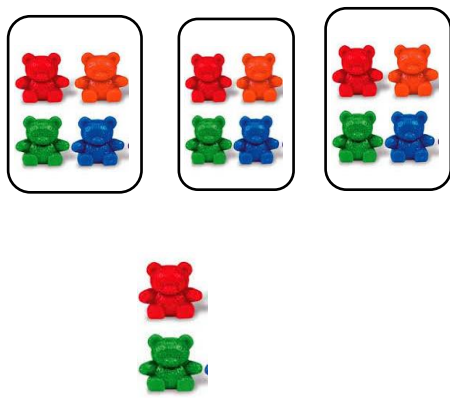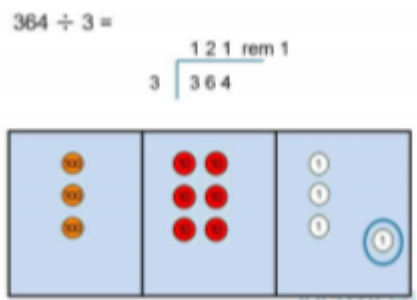| Short division	Use place value counters to divide using the short division method alongside. 96 ÷ 3	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.	Begin with divisions that divide equally with no remainder.
		Encourage them to move towards counting in multiples to divide more efficiently.	$$\begin{array}{r} 2\ 1\ 8\ ^3 \\ \hline 4\,|\,8\ 7\ 2 \end{array}$$
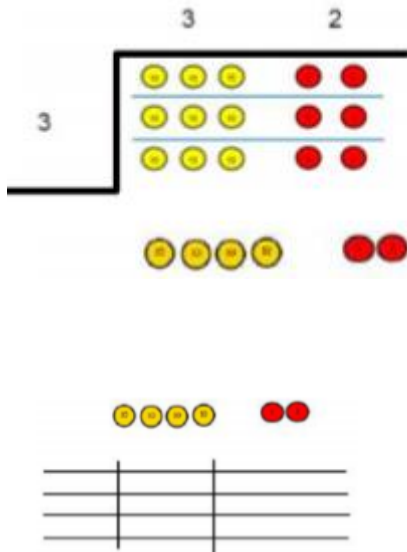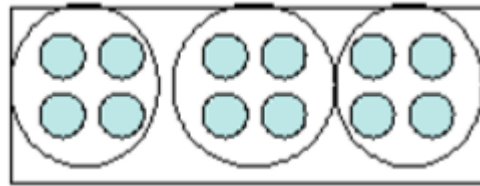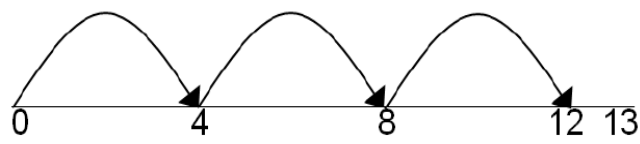
		42 ÷ 3 Start with the biggest place value. We are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over. We exchange this ten for 10 ones and then share the ones equally among the groups. We look at how many are in each group.		
Year 5 and 6	**Division with reminders**	14 ÷ 3 = Divide objects between groups and see how much is left over	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.	Complete written divisions and show the remainder using r. 29 ÷ 8 = 3 REMAINDER 5 dividend divisor quotient remainder

| Short division with remainders | $364 \div 3 =$

$\begin{array}{r} 1\ 2\ 1\ \text{rem 1} \\ 3\ \overline{|\ 3\ 6\ 4} \end{array}$

 | | Move onto divisions with a remainder. Once children understand remainders, begin to express as a fraction or decimal according to the context.

$\begin{array}{r} 8\ 6\ \text{r}\ 2 \\ {}^{3} \\ 5\ \overline{|\ 4\ 3\ 2} \end{array}$

$\begin{array}{r} 1\ 8\ 6\ 1/5 \\ 5\ \overline{|\ 9\ {}^{4}3\ {}^{3}1} \end{array}$

$\begin{array}{r} 1\ 4\ .\ 6 \\ {}^{16}\quad{}^{21} \\ 3\ 5\ \overline{|\ 5\ 1\ 1\ .\ 0} \end{array}$ |

	Long Division			Children will use long division to divide numbers with up to 4 digits by 2 digit numbers.
				$$\begin{array}{r} 015 \\ 32\,\overline{\smash{)}\,487} \\ -0 \\ \hline 48 \\ -32 \\ \hline 167 \\ -160 \\ \hline 7 \end{array}$$
				$$\begin{array}{r} 17 \text{ r } 19 \\ 31\,\overline{\smash{)}\,546} \\ 31\downarrow \\ \hline 236 \\ 217 \\ \hline 19 \end{array}$$