



# Cupernham Infant School Calculation Policy 2024-2025

## Addition and Subtraction

## Multiplication and Division

Cupernham Infant School calculation policy is set out in year group stages; however, prior attainment of our children is always taken into account and children progress through the stages once they're ready for the next challenge.



## Cupernham Infants School Calculation Policy

This calculation policy is for all school staff, parents and carers and this guidance is working document, which was written as a guide to indicate the progression through Addition, Subtraction, Multiplication and Division in Years R – 2. It documents the methods used when teaching calculation at Cupernham Infant School.

At Cupernham Infant School we use the CPA approach to teaching maths. This stands for Concrete (physical objects), Pictorial (pictures or drawing of resources), Abstract (calculations).

We welcome any suggestions to this document and are always looking to refine and improve where possible. We hope you find it useful!



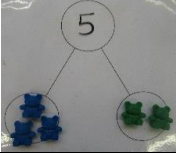

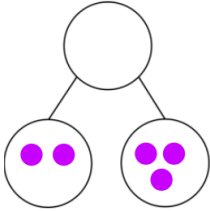
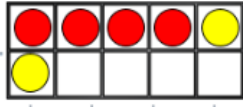
This guidance can be used by parents and carers to support their children with maths learning at home.

Children will only be able to successfully master new mathematical concepts in the abstract form (i.e.  $7 + 5 = 12$ ) if they have first explored the concept through use of concrete objects and pictorial images. Through this every child is able to successfully access abstract recordings, however they should still continue to be exposed to, and encouraged to use, both concrete and pictorial approaches so that they can continue to develop strong links between the three approaches.


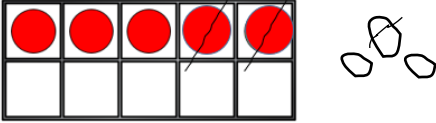
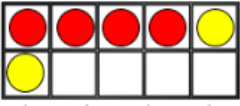
It is important to remember that the numbers children are expected to use for calculating should always be within the range below that in which they are developing their place value understanding e.g. children in Year 1 should be beginning to read, write and order numbers to 100 but will only be expected to add and subtract within the range 0-50.

The teaching and learning of Maths at Cupernham Infant School is developed in line with the National Curriculum for Mathematics in England which can be accessed at [www.gov.uk](http://www.gov.uk).

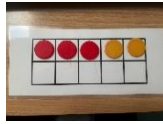
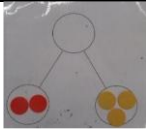
## Part 1: Addition and Subtraction

Year R	Using quantities and objects, children add two single-digit numbers and count on to find the answer.	<p><b>Concrete resources</b></p> <p>Counting altogether/combining sets. <i>You have 2 cars and Jess has 3 cars.</i> <i>How many cars do you have altogether?</i></p>  <p>Using real objects to count two sets together.</p>  <p>Progress to putting objects onto a number track to support counting. Children will also be exposed to addition on a Part-Part-Whole model and using tens frames.</p>  	<p><b>Pictorial Images</b></p> <p>Children to represent the problem through their pictures of concrete resources and through their own symbols and mark making.</p>   <p>Encourage children to add numerals to their drawings when they are ready to.</p>	<p><b>Abstract</b></p> <p>Children start to move away from drawing the real object and use representations such as circles. At this stage children are not expected to use abstract symbols such as + or -.</p>
		<p>Initially children will combine two sets always starting at 1, i.e. counting the cars above '1,2,3,4,5'. Progression from this is to count on from the first set i.e. with the cars we know there are 2 in the first set so we count on '3,4,5'.</p>		

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		<p><b>Physical removal/taking away.</b> <i>'There are 5 cars and we need to give 2 to Jess. How many cars do we have now?'</i></p> <p>Children will physically take objects 'away' and count how many are left. Progress to taking away on a number track.</p> 	<p>Children then are to represent the problem through pictures of concrete resources or through their own symbols and mark making. Not all children will include numerals initially. Children may rub out or cross out to show taking away.</p> 	
		<p>Initially children will take away by removing a set number of objects and then counting the remaining objects. Progression from this is to count back from the total i.e. counting '5, 4, 3' as they remove two cars.</p>		
<p>Year 1</p>	<p><b>Add one digit and two-digit numbers to 20, including zero.</b></p>	<p><b>Combining sets of objects or counting on to find a total with oral modelling of number sentence.</b></p> <p><i>'There are 2 red cars and 3 yellow cars. How many toys are there all together?'</i></p> <p>Children use maths resources to represent real objects. <math>2 + 3 = 5</math> represented on a Part-Part-Whole Model and/or a tens frame:</p>	<p>Children will draw the problem, maybe annotating with numerals and be able to explain what they have drawn.</p> 	<p>Before recording a number sentence in the abstract form of '<math>2 + 3 = 5</math>' children may record the calculation using words such as '<i>2 and 3 is 5</i>' or '<i>2 add 3 equals 5</i>'.</p> <p>To avoid misconceptions, the symbols + and = should not be used until the child first has a sound understanding of the meaning behind the symbols.</p>

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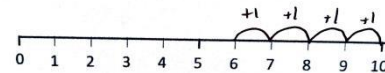
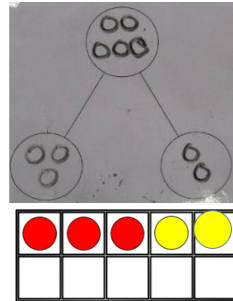
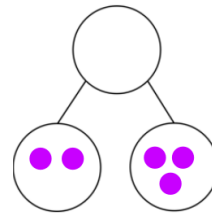
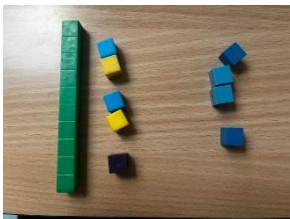


$5 + 4 = 9$  represented on a number line:

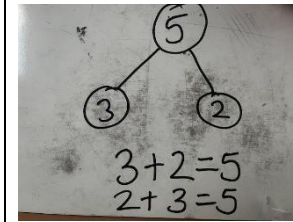
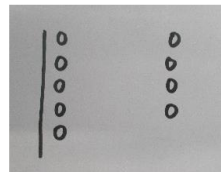


Children will be taught to start with the greatest number for more efficient adding.

As children begin to work with greater numbers they will use resources which clearly represent tens and ones.



$$6 + 4 = 10$$


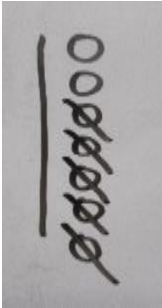
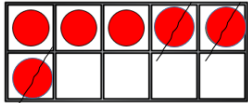
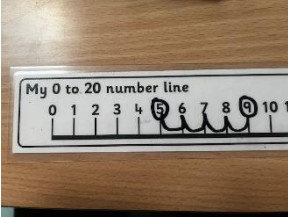
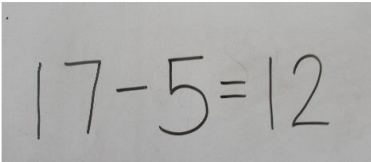

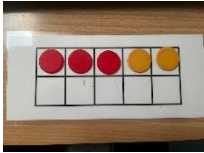
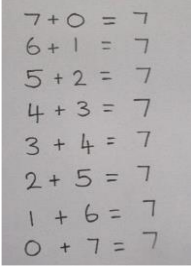


When children are confident using number lines they can use them without concrete objects or pictures and make individual jumps counting on above the line from the first number.

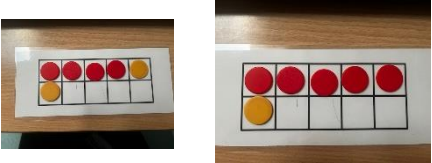
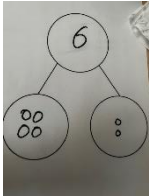
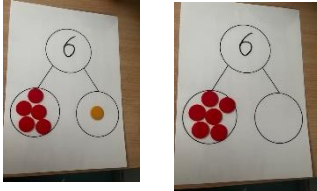
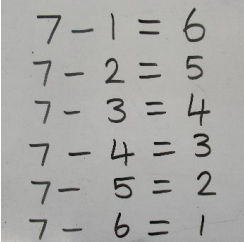
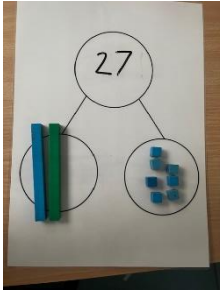
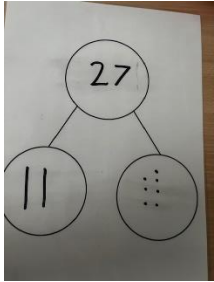
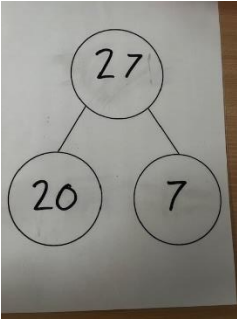
$$15 + 4 = 19$$

Children will learn about number bonds for numbers up to 20 with particular significance on the number bonds within and of 10 as this will support the fluency of their addition and subtraction calculations further on in the curriculum.

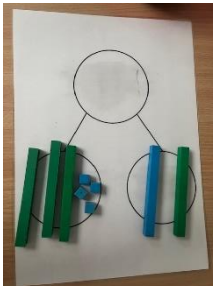
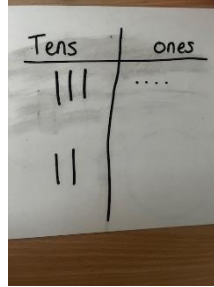
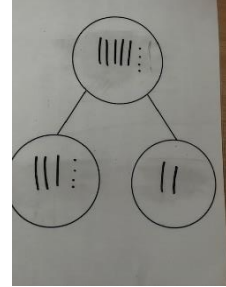
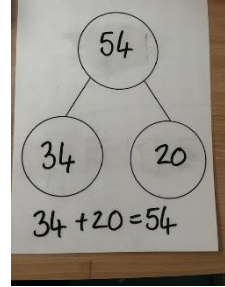
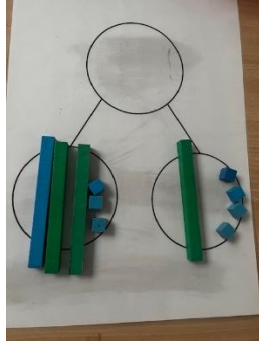
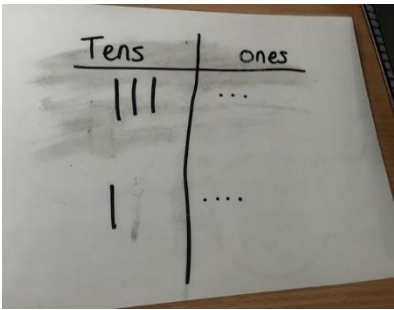
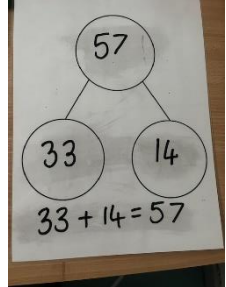
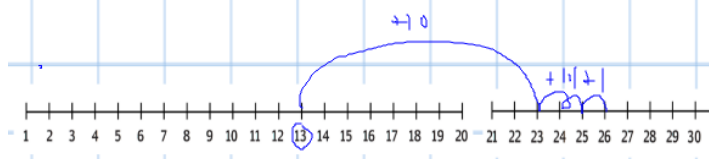
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	<p>Taking away a smaller set of object from a larger set with oral modelling of number sentence.</p> <p>Both tens frames and Part-Part-Whole models as shown above are also used to teach subtraction alongside addition.</p> <p><i>There were 9 sweets and 4 were eaten. How many sweets are there now?</i></p>  <p>17-5=</p>	  	<p>Before recording a number sentence in the abstract form of '<math>9 - 4 = 5</math>' children may record the calculation using words such as '<i>9 take away 4 is 5</i>' or '<i>9 subtract 4 equals 5</i>'.</p> <p>To avoid misconceptions, the symbols - and = should not be used until the child first has a sound understanding of the meaning behind the symbols.</p> 
<p>Represent and use number bonds and related subtraction facts within 20.</p>	<p>Children will learn the different combinations of making numbers within 10. They can represent this in a tens frame or part part whole model.</p>  		<p>Children when confident with record the numbers bonds. They can even start to work systematically.</p> 

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			 	<p>Also begin to think of the other related facts.</p> 
<p>Year 2</p>	<p>Add and subtract numbers including:  A two-digit number and ones.</p>	<p>In order for children to successfully add and subtract using two digit numbers they need to be able to confidently partition numbers into tens and ones:  27 partitioned into tens and ones either with a part part whole model or tens and ones chart:</p> 	<p>The children will then draw:</p> 	

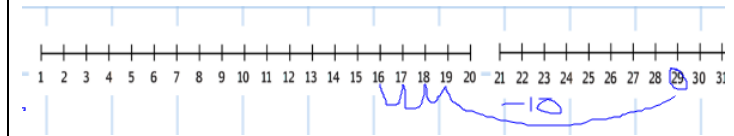
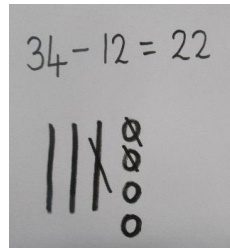
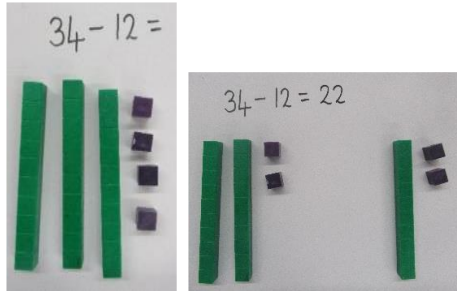
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<p>A two-digit number and tens.</p>	<p>Children will need to be able to orally count on and back in 10s from any number before they are ready to count on and back in 10s on a number line i.e. 43, 33, 23, 13, 3</p> <p><math>34 + 20 =</math></p>  	 
<p>Two two digit numbers.</p>	<p><math>33 + 14 =</math></p>  	 <p>Children then progress to use a number line first adding tens and single ones; then adding ones in a jump.</p> 

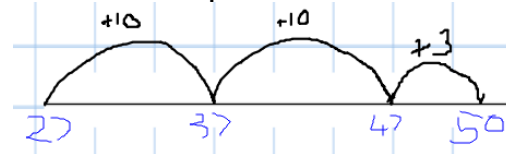


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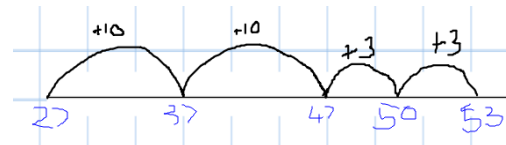
$34 - 12 =$



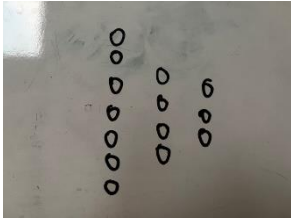

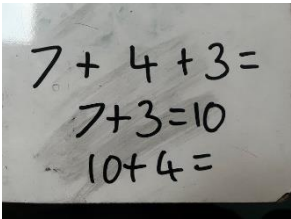

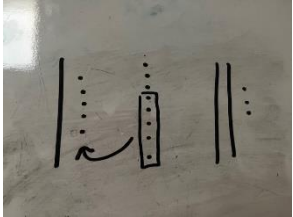

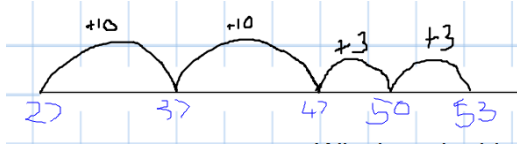
Then when they're confident, an empty number line (unstructured) and by the end of year 2, children will be efficiently solving problems using their knowledge of number and place value.



Children will use the number bonds to support their problem solving i.e. 'I add 3 to 47 because  $7+3=10$  so  $57+3=47$  then I need to add 3 to a tens number.'



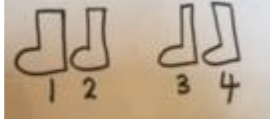


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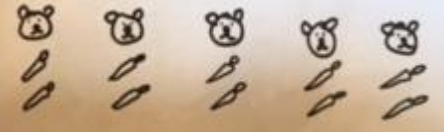

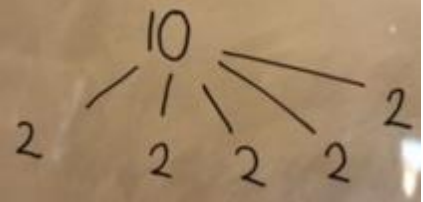

<p>Adding three one digit numbers.</p>	<p>Children are taught that once they have 10 ones they exchange them for a ten.</p> <p><math>7 + 4 + 3 =</math></p>		<p>The children will use their number bonds to support their finding the answer.</p>
	<p>Recall and use addition and subtraction facts to 20 fluently.</p>	<p>Children will use their developing knowledge of number bonds to help them solve addition and subtraction problems for example by bridging to 10:</p>	
			<p>Children will then begin to be efficient on an empty number line</p>
			

		In the number sentence $15 + 8$ children will know that 5 more than 15 makes 20. 5 and 3 are bonds to 8. They can use this to solve the problem.		
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## Part 2: Multiplication and Division

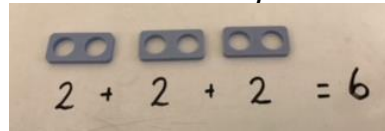
Year R	Odd and Even	Concrete resources	Pictorial Images	Abstract
		<p>Using quantities and objects to solve problems, including:</p> <ul style="list-style-type: none"> <li>□ doubling</li> </ul>	<p>Multiplication and division learning in Year R will be through real life contexts, role play and stories. Children will also be exposed to counting in 2s, 5s and 10s towards the end of the year.</p> <p><i>Sam and Jess both have wellies on today. How many wellies can we see?</i></p>  <p><i>We have 5 fingers on one hand. How many fingers do we have on 2 hands?</i></p> 	 <p>Children are encouraged to represent the problem in a way that is meaningful to them.</p>

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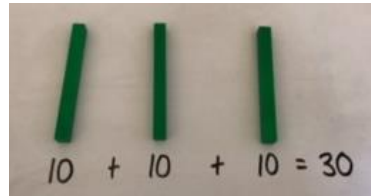
		<p>As well looking at the 'real' problems children will be encouraged to use concrete resources.</p>		
	<ul style="list-style-type: none"> <li>• halving and sharing.</li> </ul>	<p><i>Can you share the 10 carrots equally between the 5 teddies?</i></p>  <p><i>How can we cut this apple in half?</i></p> 	 	 
<p>Year 1</p>	<p>Solve one-step problems involving multiplication by calculating the answer using concrete objects and pictorial representations with the support of the teacher</p>	<p>Children will learn to count in 2s, 5s and 10s. A large amount of the multiplication and division learning in Year 1 and 2 will be based around the 2, 5 and 10 times tables. In Year 1 we use repeated addition and the language of 'groups of' and 'lots of' when learning multiplication. The purpose of this is to provide all children with a good understanding of multiplication so that when they use the x symbol they have a really secure understanding of what the symbol really means.</p> <p>When introducing multiplication, the first step would be, where possible, to act out the problem with real objects.</p> <p>We will then move onto concrete representations for problems such as Numicon or counting objects.</p>	<p>Children will be encouraged to draw out the problem to show their understanding as well as to supporting them to solve it.</p>	<p>When children have developed a good understanding of repeated addition and can interpret what the question is asking they may use more abstract models such as number lines.</p>

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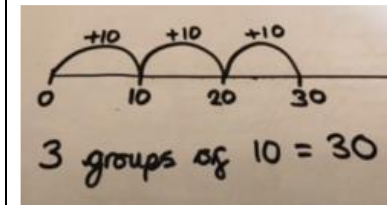
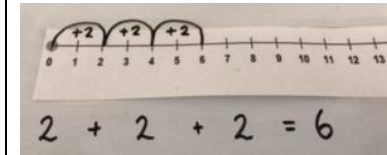
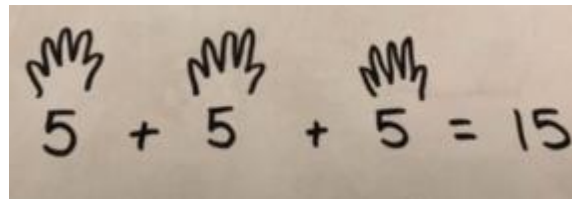
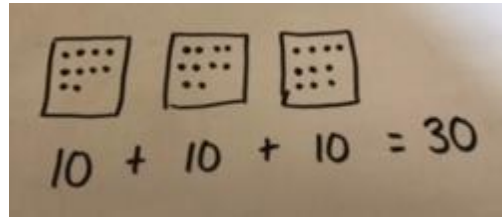
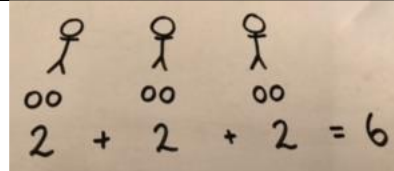
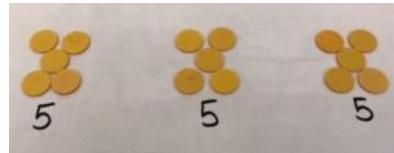
'3 children take their shoes off for P.E and leave them in a hoop. How many shoes are in the hoop?'



Sweets come in bags of 10. How many sweets would be in 3 bags?'



'The teacher can see three hands up. How many fingers can he see?'


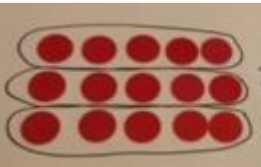
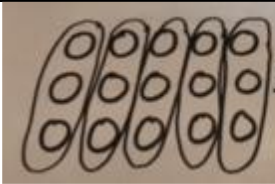

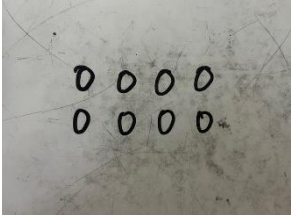


Arrays play a big role in allowing children to make the link between multiplication and division as they can be interpreted in multiple ways. When we look at arrays we talk about rows and columns as well as groups.

In this array there are 3 rows and 2 columns.

You could say: '3 groups of 2 is 6'

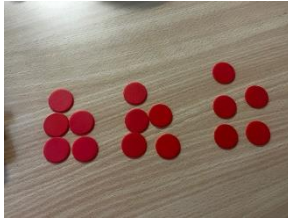
## Cupernham Infants School Calculation Policy

		<p>'2 groups of 3 is 6'          '6 shared into 2 is 3'          '6 shared into 3 is 2'</p>
	<p>Children will interpret arrays as well as making their own arrays:          3 groups of 5</p> 	 <p>5 groups of 3</p>
	<p>When learning about division children will use two different methods; grouping and sharing. In Year 1 we use the language of 'groups of' and 'shared between' when learning division. The purpose of this is to provide all children with a sound understanding of division so that when they use the <math>\div</math> symbol in Year 2 they have a really secure understanding of what the symbol really means.</p>	
<p>Solve one-step problems involving division by calculating the answer using concrete objects and pictorial representations with the support of the teacher.</p>	<p>Grouping:          In order to understand multiplication as grouping, the children will learn what equal groups are.</p> <p>'You have 8 gloves, how many groups of 2 can you make?'</p> 	

## Cupernham Infants School Calculation Policy

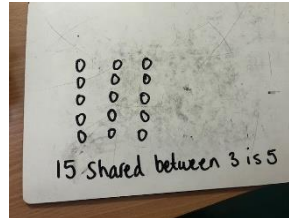
Sharing:

*'There are 15 cakes. Share them equally between 3 friends.'*

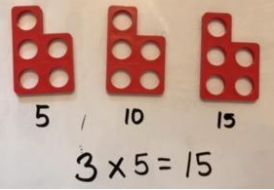


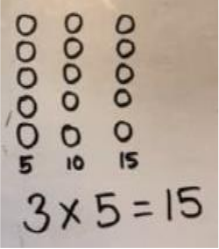
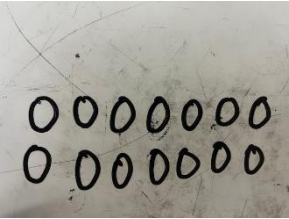
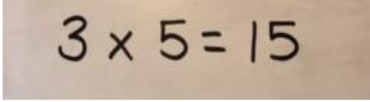
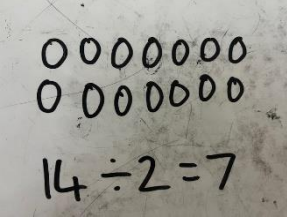


When children share they will use the 'one for you, one for you...' method, dividing the objects equally until they have used up all the objects.

Children will draw one object at a time in each group until they have drawn the total amount they needed to share.

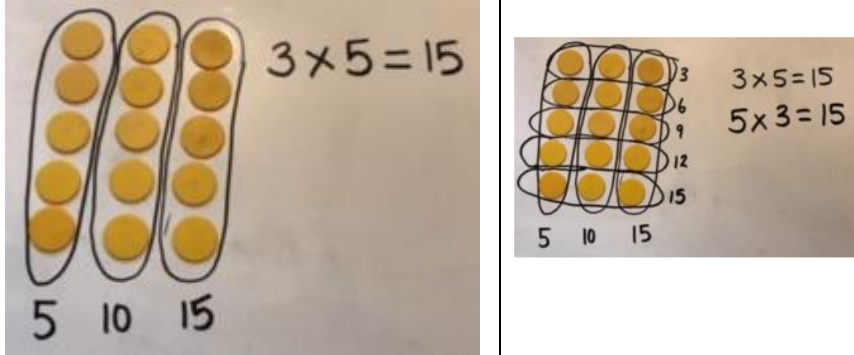
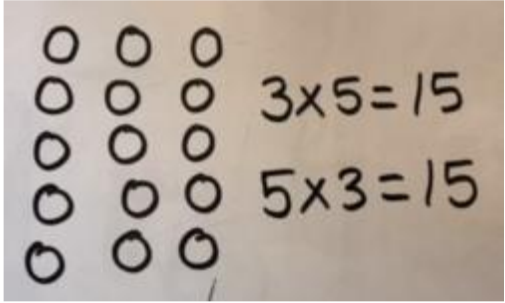


Cupernham Infants School Calculation Policy

Year 2	<p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\times</math>), division (<math>\div</math>) and equals (<math>=</math>) signs.</p>	<p>In Year 2 we continue to do lots of work around the 2, 5 and 10 times tables and by the end of the year they will become more fluent. Children will have seen the <math>\times</math> and <math>\div</math> symbol in Year 1 alongside the vocabulary of 'groups of' and 'shared between' and will now begin to use these symbols. Children will use arrays to support their understanding of commutativity (<math>2 \times 3 = 6</math>, <math>3 \times 2 = 6</math>) and start to use larger numbers in calculations as they become more competent.</p>		
		<p><math>3 \times 5 =</math></p>  <p><math>14 \div 2 =</math></p> <p>(grouping)</p>  <p>(sharing)</p> 	 	 



Cupernham Infants School Calculation Policy

<p>Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.</p>	<p>Use an array to show that <math>3 \times 5 = 5 \times 3</math></p> 		
<p>Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in</p>	<p>Children will solve increasingly complex problems using methods they have previously learnt and resources they are familiar with and will be asked to show these in different ways to demonstrate depth of understanding.</p>		
	<p>Ann has 20 sweets and shares them between 5 friends. Tom has 20 sweets and shares them between 10 friends. Whose friends get more sweets? How do you know?</p>	<p>Complex problem: <math>6 \times 5 = \text{----} + 14 + 5</math> <math>8 \times 2 = \text{----} \div 2</math></p>	
	<p>Children will begin to use their increased knowledge of the 2, 5 and 10 times tables and understanding of arrays to secure the concept of <i>inverse</i> in multiplication and division. If we know <math>5 \times 10 = 50</math> we also know <math>50 \div 10 = 5</math>. We can use our times table knowledge to work out division problems as well as multiplication problems.</p> <p>Children will use their knowledge of multiplication and begin to use their recall of their facts to help them solve problems.</p>		