

★ Garden Suburb Infant School ★

Calculation Policy

We follow the White Rose Scheme of Learning and this calculation policy has been largely adapted from the White Rose Maths Hub Calculation Policy. It is a working document and will be amended as necessary.

It illustrates the key representational and written procedures for addition, subtraction, multiplication and division, that will be taught. Alongside this, we also recognise the importance of children describing and explaining their calculation methods using appropriate mathematical vocabulary.

Aims:

- To provide all teaching and learning staff with guidance for the teaching of calculation methods from Reception to Year Two.
- To ensure consistency of practice
- To ensure smooth progression from mental to written calculation in order to develop the knowledge, skills and conceptual understanding needed to solve problems and reason.
- To highlight our Practical, Visual, Abstract approach to teaching which ensures children have a deep understanding of mathematical structures.
- To provide parents with guidance about the methods we use to teach calculation

In Reception, children are encouraged to explore their own methods of recording as well as using number tracks, ten frames and their fingers.



We use a range of objects to support the children's understanding of calculations and how they are relevant to everyday life.


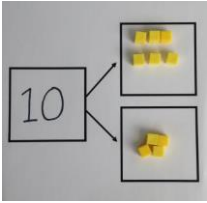


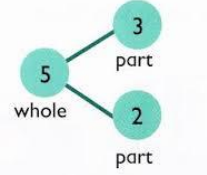

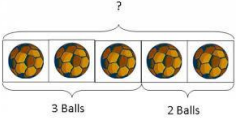

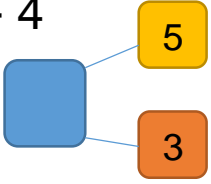


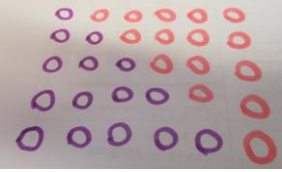
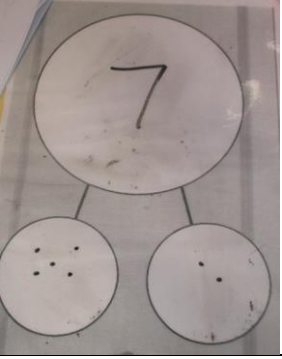
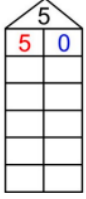



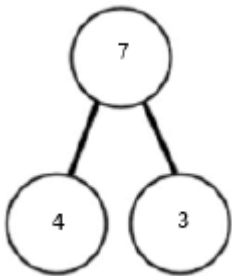
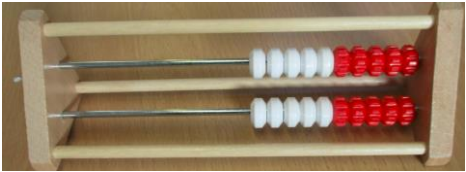
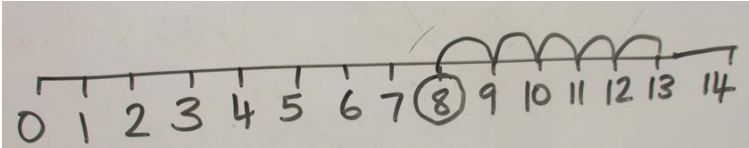
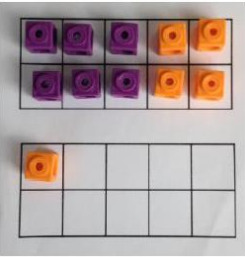
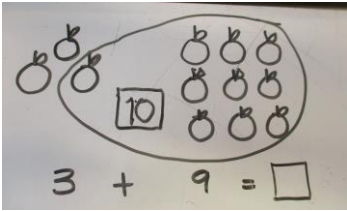
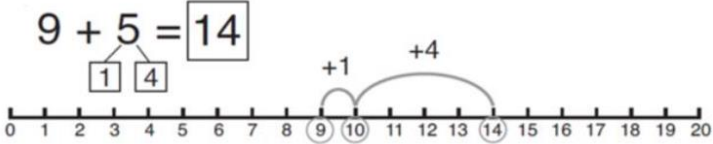



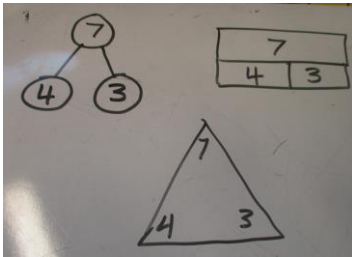
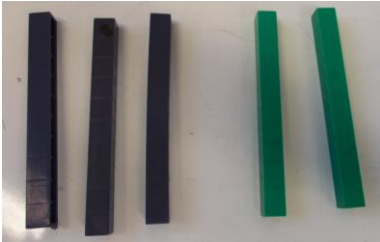
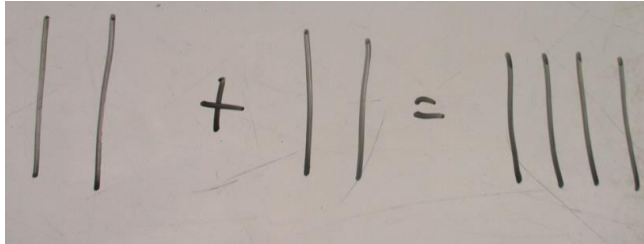
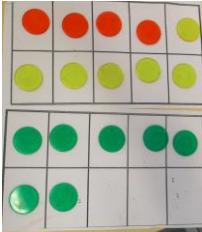
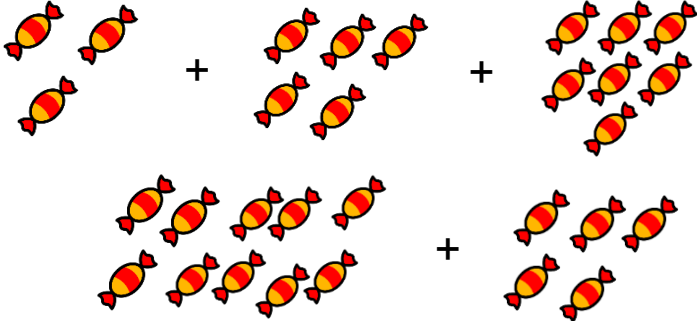
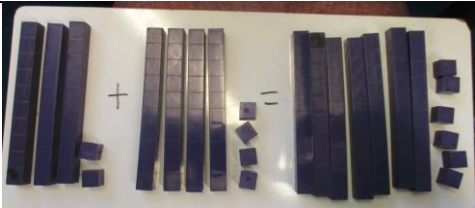
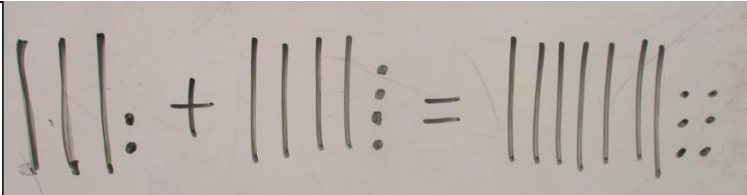
We use a range of mathematical manipulatives in order to support the children's understanding of the calculation.



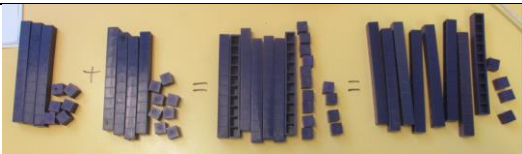
Addition

Objective and Strategies	Practical	Visual	Abstract
Combining two parts to make a whole: part- whole model	  <p>Use cubes to add two numbers together as a group or in a bar.</p>  	   <p>Use pictures to add two numbers together as a group or in a bar.</p> 	$4 + 3 = 7$ $10 = 6 + 4$  <p>Use the part-part whole diagram as shown above to move into the abstract.</p>
Calculate all the number bonds for numbers within 10	 	 	 $0 + 5 = 5$ $1 + 4 = 5$ $2 + 3 = 5$ $3 + 2 = 5$ $4 + 1 = 5$ $5 + 0 = 5$

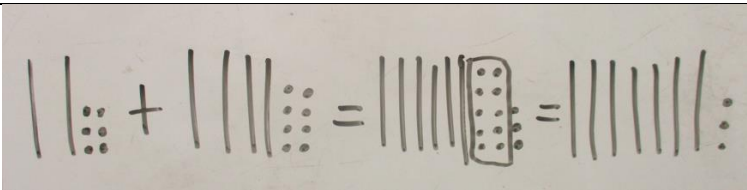
			
<p>Starting at the bigger number and counting on</p>	 <p>Start with the larger number and then count on to the smaller number 1 by 1 to find the answer.</p>	<p>$8 + 5 = 13$</p>  <p>Start at the larger number on the number line and count on in ones or in one jump to find the answer.</p>	<p>$5 + 12 = 17$</p> <p>Place the larger number in your head and count on the smaller number to find your answer.</p>
<p>Regrouping to make 10</p>	 <p>$6 + 5 = 11$</p> <p>Start with the bigger number and use the smaller number to make 10.</p>	 <p>Use pictures or a number line. Regroup or partition the smaller number to make 10.</p> <p>$9 + 5 = 14$</p> 	<p>$7 + 4 = 11$</p> <p>If I am at seven, how many more do I need to make 10. How many more do I add on now?</p> <p>$6 + 5 = 10 + 1$</p>

Fact families & related facts		 <p>Use a variety of visual representations to show the part and whole</p>	$4 + 3 = 7$ $3 + 4 = 7$ $7 = 4 + 3$ $7 = 3 + 4$
Adding multiples of 10 & the number bonds to 100 (tens)			$20 + 30 = 50$ $40 + 60 = 100$ $100 = 70 + 30$
Adding three single digits	$4 + 7 + 6 = 17$ Put 4 and 6 together to make 10. Add on 7.  <p>Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.</p>	 <p>Add together three groups of objects. Draw a picture to recombine the groups to make 10.</p>	$4 + 7 + 6 = 10 + 7 = 17$ Combine the two numbers that make 10 and then add on the remainder.
Add two 2-digit numbers (not crossing 10s)	 <p>Add the tens then add the ones.</p>		$32 + 44 = 76$

Add two 2-digit numbers (crossing 10s)

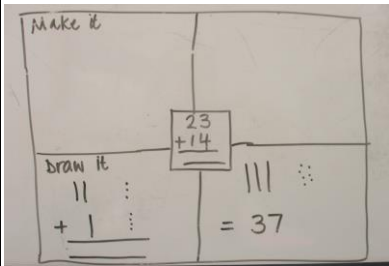
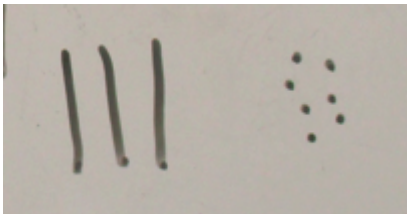
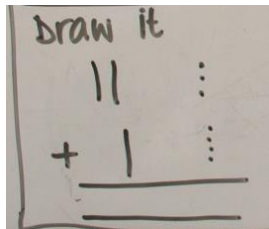


Add the tens, add the ones and then exchange the 10 ones for a stick of 10.



$$26 + 48 = 74$$

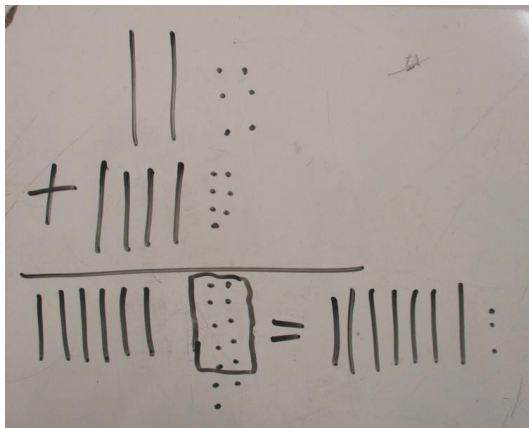
Column method: no regrouping



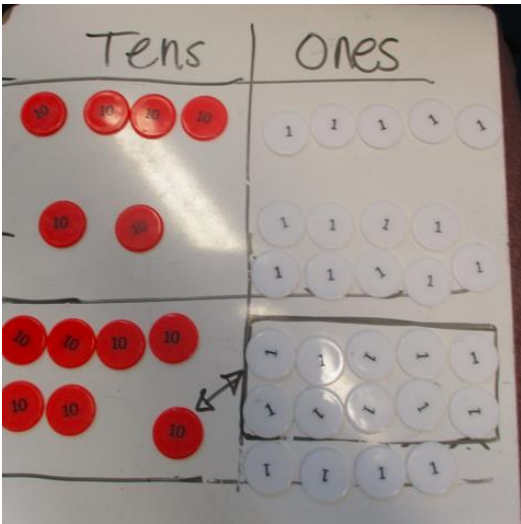
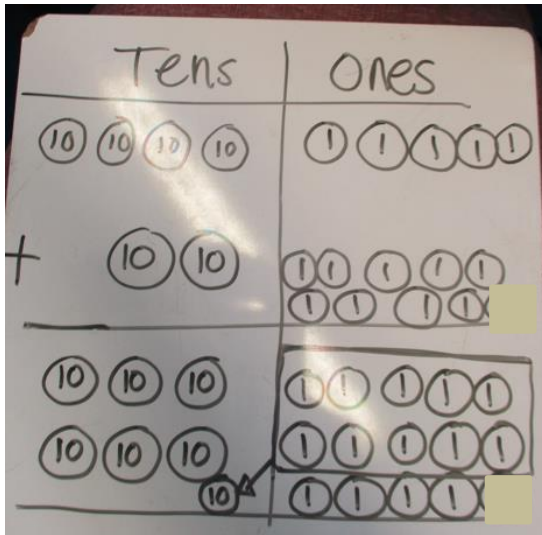
Column method: regrouping



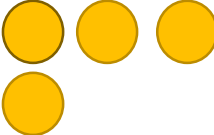
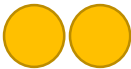

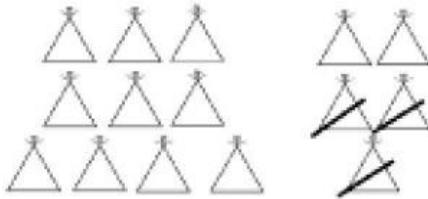
Add the tens, then add the ones. There are more than 10 ones so 10 ones can be exchanged for one stick of 10.



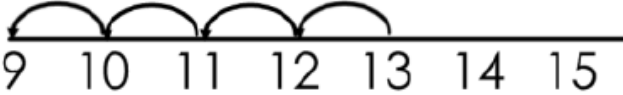
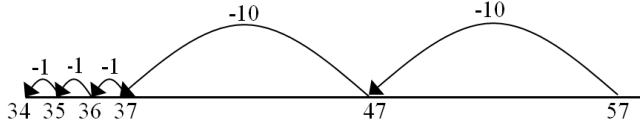
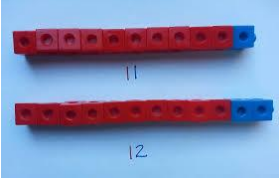
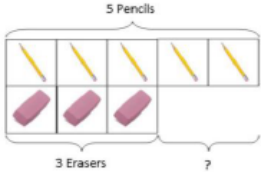
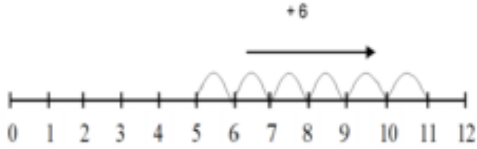
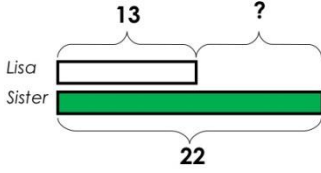


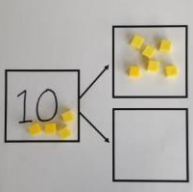
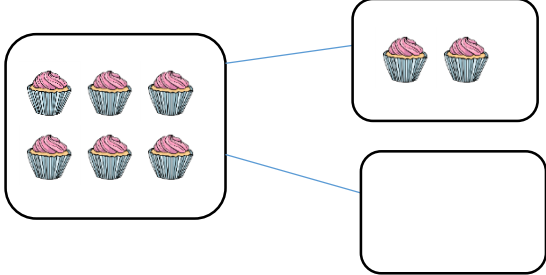
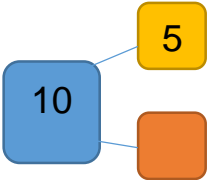

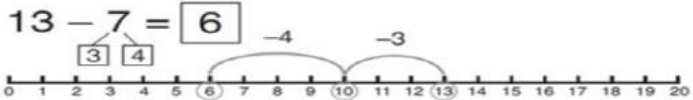
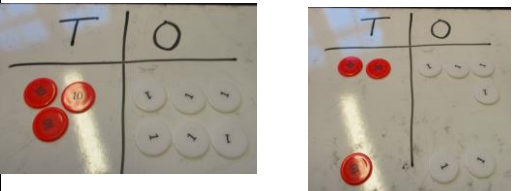
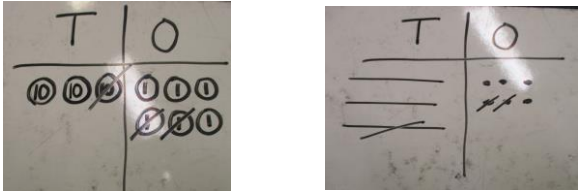

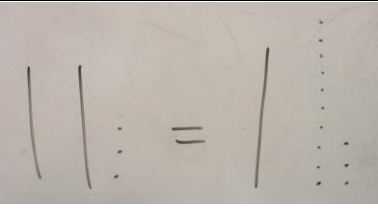
$$\begin{array}{r} 26 \\ + 47 \\ \hline 73 \end{array}$$

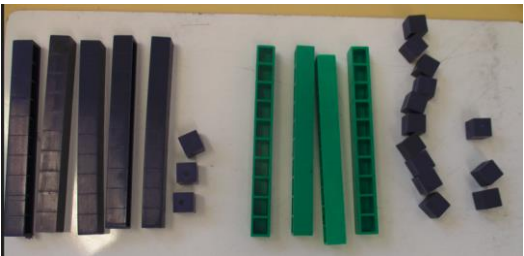
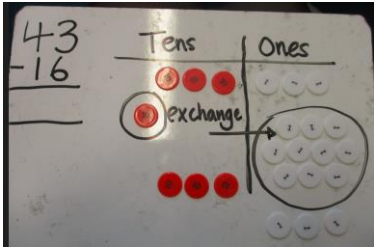
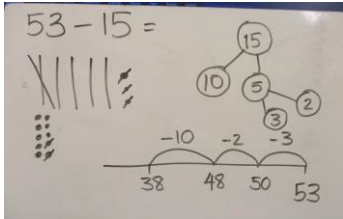
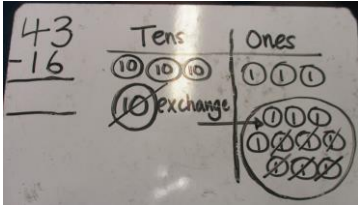
			$\begin{array}{r} 45 \\ + 29 \\ \hline 74 \end{array}$
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Subtraction

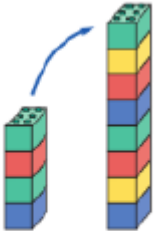

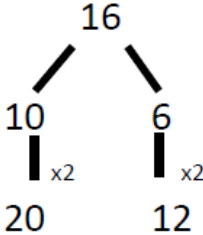
Objective and Strategies	Practical	Visual	Abstract
Taking away ones	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p> <p>  $6 - 2 = 4$ </p> <p>   </p>	<p>Cross out drawn objects to show what has been taken away.</p> <p>  </p> <p> $15 - 3 = \boxed{12}$ </p>	$18 - 3 = 15$ $8 - 2 = 6$

<p>Counting back</p>	<p>Make the larger number in your subtraction. Move the beads along your Rekenrek as you count backwards in ones.</p>  <p>$13 - 4$</p> <p>Use counters and move them away from the group as you take them away counting backwards as you go.</p> 	<p>Count back on a number line or number track</p>  <p>Start at the bigger number and count back the smaller number showing the jumps on the number line.</p>  <p>This can progress all the way to counting back using two 2 digit numbers.</p>	<p>Put 13 in your head, count back 4. What number are you at? Use your fingers to help.</p>
<p>Find the difference</p>	<p>Compare amounts and objects to find the difference.</p>  <p>Use cubes to build towers or make bars to find the difference</p> <p>Use basic bar models with items to find the difference</p> 	 <p>Count on to find the difference.</p> <p>Comparison Bar Models</p> <p>Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.</p>  <p>Draw bars to find the difference between 2 numbers.</p>	<p>Hannah has 23 sandwiches. Helen has 15 sandwiches. Find the difference between the number of sandwiches.</p>

Part Whole Model	<p>Link to addition- use the part whole model to help explain the inverse between addition and subtraction.</p>  <p>If 10 is the whole and 6 is one of the parts. What is the other part?</p> <p>$10 - 6 =$</p>	<p>Use a pictorial representation of objects to show the part whole model.</p> 	 <p>Move to using numbers within the part whole model.</p>
Make 10	<p>$14 - 9 =$</p>  <p>Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.</p>	<p>$13 - 7 = 6$</p>  <p>Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.</p>	<p>$16 - 8 =$</p> <p>How many do we take off to reach the next 10?</p> <p>How many do we have left to take off?</p>
Column method without regrouping	<p>Use Dienes to make the number then take the other number away.</p> 	<p>Draw the Dienes or place value counters alongside the written calculation to help to show working.</p> 	<p>This will lead to a clear written column subtraction.</p> $\begin{array}{r} 30 \ 6 \\ - 10 \ 2 \\ \hline 20 \ 4 \end{array}$ $\begin{array}{r} 36 \\ - 12 \\ \hline 24 \end{array}$
Column method with regrouping	<p>Children need to learn to exchange first.</p> 		<p>$23 = 1 \text{ ten and } 13 \text{ ones}$</p>

	 	 	$\begin{array}{r} 50\ 3 \\ -10\ 5 \\ \hline 30\ 8 \end{array}$ $53 - 15 = 38$
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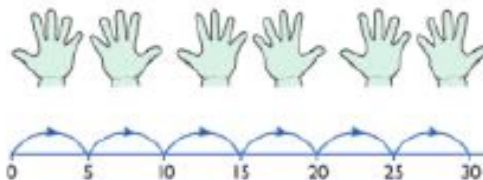
Multiplication

Objective and Strategies	Practical	Visual	Abstract
Doubling	<p>Use practical activities to show how to double a number.</p>  <p>double 4 is 8 $4 \times 2 = 8$</p>	<p>Draw pictures to show how to double a number.</p> <p>Double 4 is 8</p> 	 <p>Partition a number and then double each part before recombining it back together.</p>

Counting in multiples



Count in multiples supported by concrete objects in equal groups.



Use a number line or pictures to continue support in counting in multiples.

Count in multiples of a number aloud.

Write sequences with multiples of numbers.

2, 4, 6, 8, 10
5, 10, 15, 20, 25, 30

Repeated addition

Use different objects to add equal groups.

3 + 3 + 3

There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?

2 add 2 add 2 equals 6

5 + 5 + 5 = 15

Write addition sentences to describe objects and pictures.

2 + 2 + 2 + 2 + 2 = 10

Arrays- showing commutative multiplication

Create arrays using counters/ cubes to show multiplication sentences.


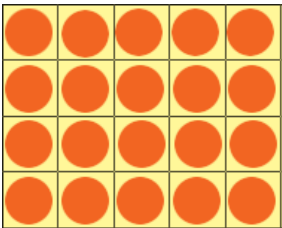

Draw arrays in different rotations to find **commutative** multiplication sentences.

2 x 4 = 8


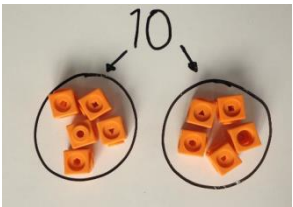
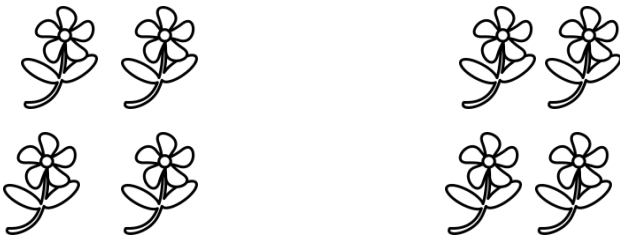
4 x 2 = 8

4 x 2 = 8

Use an array to write multiplication sentences and reinforce repeated addition.

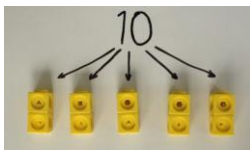
		 <p>Link arrays to area of rectangles.</p>	 $5 + 5 + 5 = 15$ $3 + 3 + 3 + 3 + 3 = 15$ $5 \times 3 = 15$ $3 \times 5 = 15$
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Division

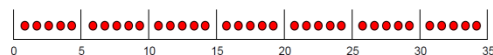
Objective and Strategies	Practical	Visual	Abstract
<p>Sharing objects into groups</p>	 <p>I have 10 cubes, can you share them equally in 2 groups?</p> 	<p>Children use pictures or shapes to share quantities.</p>  <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> $8 \div 2 = 4$ </div>	<p>Share 9 buns between three people.</p> $9 \div 3 = 3$

Division as grouping

Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.



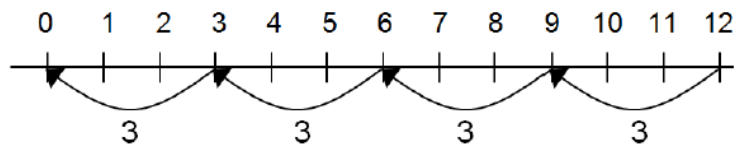
Show division on a number line:



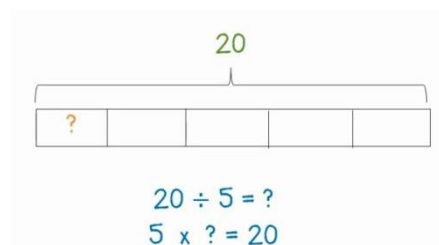
Sharing objects into sharing circles:



Use a number line to show jumps in groups. The number of jumps equals the number of groups.



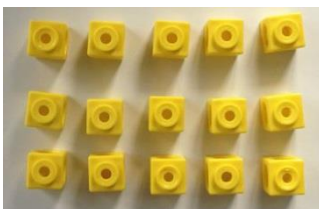
Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.



$$18 \div 3 = 6$$

Divide 18 into 3 groups. How many are in each group?

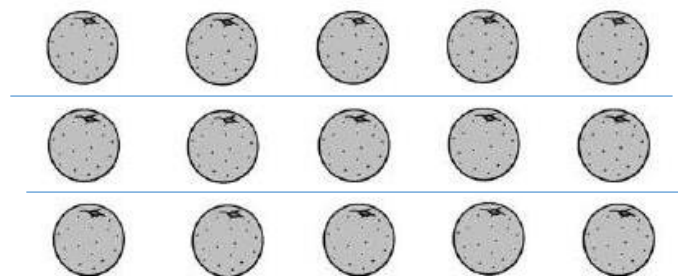
Division within arrays



Link division to multiplication by creating an array and thinking about the

number sentences that can be created.

Eg $15 \div 3 = 5$ $5 \times 3 = 15$
 $15 \div 5 = 3$ $3 \times 5 = 15$



Draw an array and use lines to split the array into groups to make multiplication and division sentences.

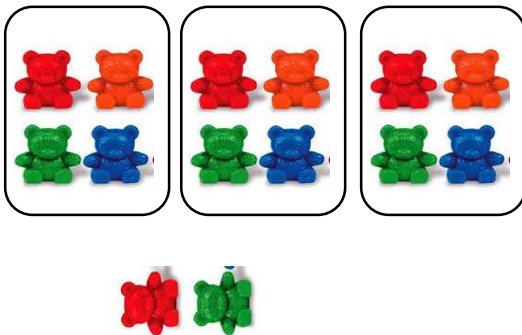
Find the inverse of multiplication and division sentences by creating four linking number sentences.

$5 \times 3 = 15$
 $3 \times 5 = 15$
 $15 \div 5 = 3$
 $15 \div 3 = 5$

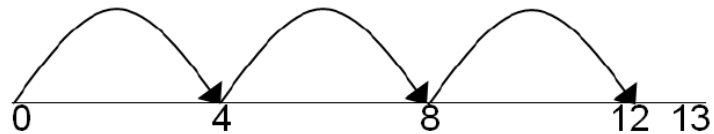
Division with a remainder

$$14 \div 3 =$$

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.

$$29 \div 8 = 3 \text{ REMAINDER } 5$$

↑ ↑ ↑ ↑
dividend divisor quotient remainder