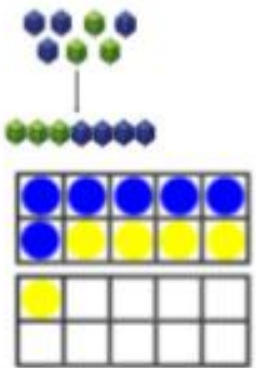
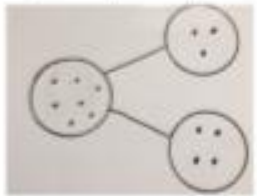
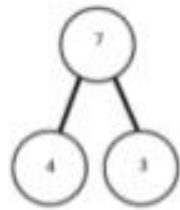
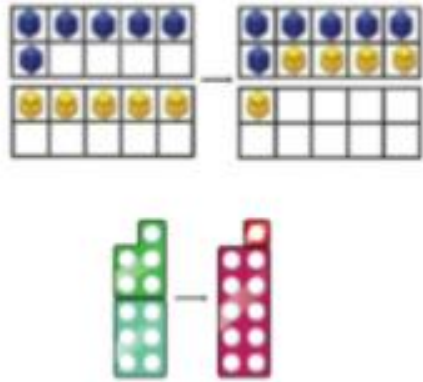
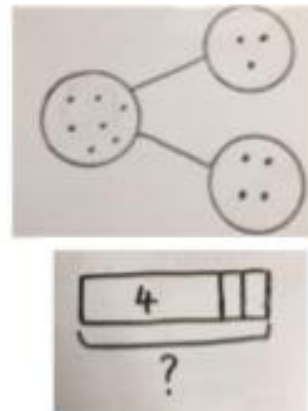

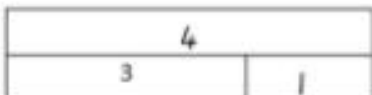


Riverview Infant School Calculation Policy



Calculation policy—Addition

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

Objectives	Concrete	Pictorial	Abstract
<p>EYFS</p> <p>Adds and subtracts, using quantities and objects, 2 single-digit numbers, and counts on or back to find the answer (ELG)</p> <p>Finds the total number of items in two groups by counting all of them</p>	<p>Combining two parts to make a whole (use other resources too e.g. eggs, shells, teddy bears, cans)</p> 	<p>Children to represent the cubes using dots or crosses. They could put each part on a part whole model too.</p> 	<p>$4 + 3 = 7$ Four is a part, 3 is a part and the whole is seven.</p> 
<p>Year 1</p> <p>Read and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p> <p>Write mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p> <p>Represent and use number bonds within 20</p> <p>Add one-digit and two-digit numbers to 20, including zero</p>	<p>Use tens frames, counters and numicon.</p> 	<p>Part whole models and bar models.</p> 	<p>Part whole models</p> <p>$4 + 3 = 7$ Four is a part, 3 is a part and the whole is seven.</p>  <p>Bar models $3 + 1 = 4$</p> 

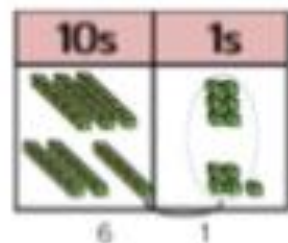
Year 2

I can solve problems with addition and subtraction including those involving numbers, quantities and measures by using objects or pictures

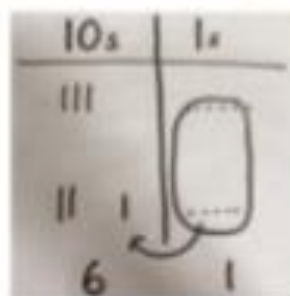
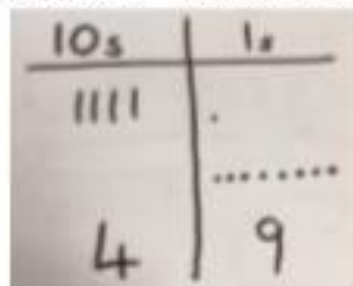
I can answer simple addition and subtraction questions in my head as well as by writing them down

I can add and subtract 2 two digit numbers mentally and when using objects, number lines and pictures

Use base 10

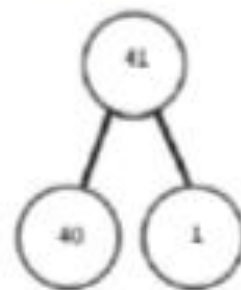


Draw tens and ones - lines and dots.



Part whole models and partitioning

$$41 + 8$$



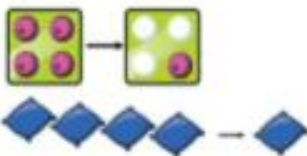
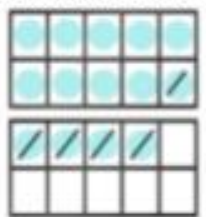
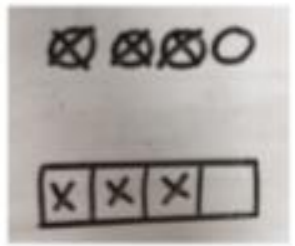
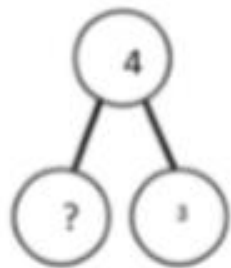

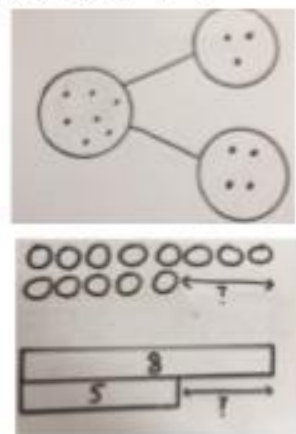
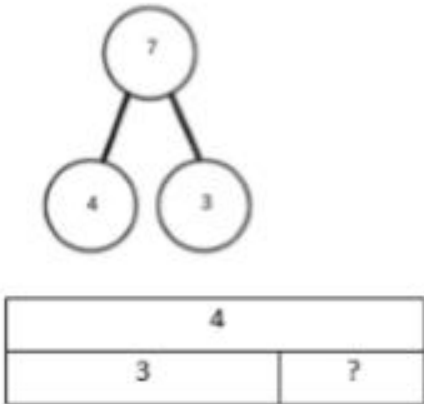
$$1 + 8 = 9$$
$$40 + 9 = 49$$

$$36 + 25 =$$

A partitioning diagram for 36 + 25. The number 36 is at the top, with a blue line branching down to '1' and '5'. The number 25 is to its right. To the right of the diagram are the equations: $30 + 20 = 50$, $5 + 5 = 10$, and $50 + 10 + 1 = 61$.

Calculation policy— subtraction

Key language: *takeaway, less than, the difference, subtract, minus, fewer, decrease.*

Objectives	Concrete	Pictorial	Abstract
<p>EYFS</p> <p>Adds and subtracts, using quantities and objects, 2 single-digit numbers, and counts on or back to find the answer (ELG)</p>	<p>Physically take away objects.</p> <p>$4 - 3 = 1$</p>  <p>Use tens frames and counters</p> 	<p>Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.</p> 	<p>Part whole models</p> 
<p>Year 1</p> <p>Read and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p> <p>Write mathematical statements involving addition (+), subtraction (-) and equals (=) signs</p> <p>I can use subtraction facts up to 20</p> <p>I can subtract one digit and two digit numbers to 20</p>	<p>Use tens frames and counters.</p> <p>Children to present the ten frame pictorially and discuss what they did to make 10.</p> 	<p>Part whole models $7 - 3 = 4$</p> 	<p>Part whole models and bar models $7 - 3 = 4$</p> 

Year 2

I can solve problems with addition and subtraction including those involving numbers, quantities and measures by using objects or pictures

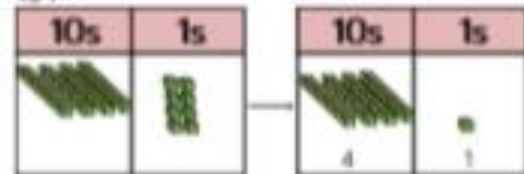
I can answer simple addition and subtraction questions in my head as well as by writing them down

I can add and subtract 2 two digit numbers mentally and when using objects, number lines and pictures

Use base 10

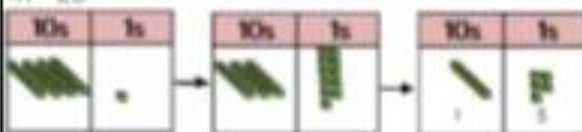
Column method using base 10.

48-7



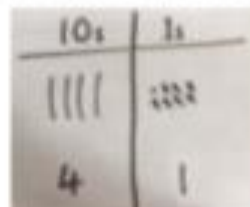
Column method using base 10 and having to exchange.

41 - 26

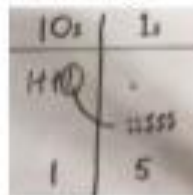


Draw tens and ones - lines and dots.

Children to represent the base 10 pictorially.



Represent the base 10 pictorially, remembering to show the exchange.



Part whole models and partitioning

Children to show how they can make 10 by partitioning the subtrahend.

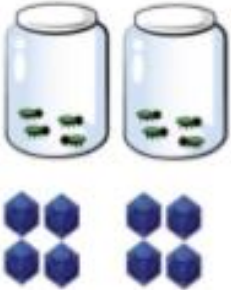

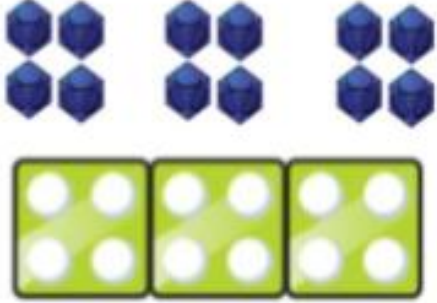

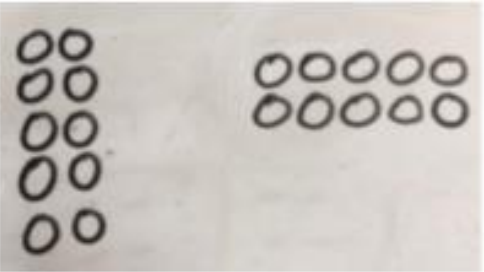
$$14 - 5 = 9$$

A diagram showing the number 5 partitioned into 4 and 1, with lines connecting 5 to 4 and 1.

$$14 - 4 = 10$$
$$10 - 1 = 9$$

Calculation policy— Multiplication

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

Objectives	Concrete	Pictorial	Abstract
<p>EYFS</p> <p>Solve problems, including doubling, halving and sharing</p> <p>Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups (ELG Exc)</p>	<p>Doubling using objects</p> 	<p>Doubling using pictures</p> 	<p>Double 2</p> $2 + 2 = 4$
<p>Year 1</p> <p>Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p>	<p>Repeated groups</p>  <p>Create arrays</p> 	<p>Draw arrays</p> 	<p>Write repeated additions</p> $2 + 2 + 2 + 2 + 2 = 10$

Year 2

Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs

Solve problems involving multiplication and division, using arrays, repeated addition and multiplication and division facts, including problems in contexts e.g. knowing that $2 \times 7 = 14$ and $2 \times 8 = 16$, explains that making pairs of socks from 15 identical socks will give 7 pairs and one sock will be left

Create arrays

$$2 \times 5 = 5 \times 2$$

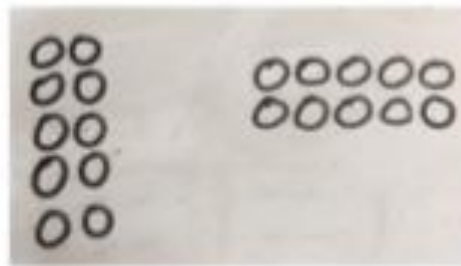


2 lots of 5



5 lots of 2

Children to represent the arrays pictorially.



Using a numberline



Children to be able to use an array to write a range of calculations e.g.

$$10 = 2 \times 5$$

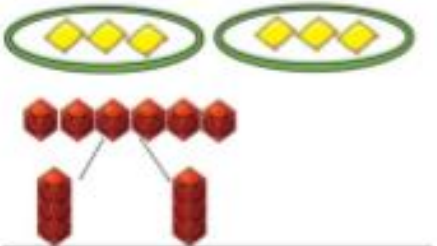
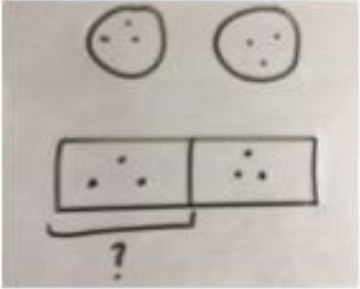
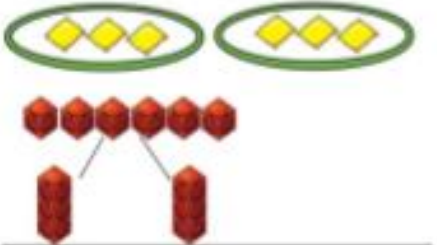
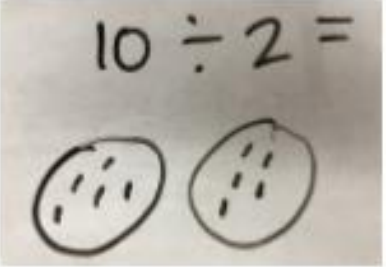
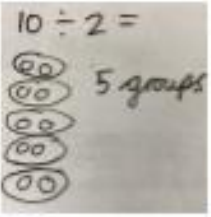
$$5 \times 2 = 10$$

$$2 + 2 + 2 + 2 + 2 = 10$$

$$10 = 5 + 5$$

Calculation policy— Division

Key language— share, group, divide, divided by, half

Objectives	Concrete	Pictorial	Abstract		
<p>EYFS</p> <p>Solve problems, including doubling, halving and sharing</p> <p>Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups (ELG Exc)</p>	<p>Halving using objects</p> <p>Sharing using a range of objects 6 ÷ 2</p> 	<p>Halving using pictures</p> 	<p>Half of 6</p> <table border="1" data-bbox="1702 475 2181 546"> <tr> <td>3</td> <td>3</td> </tr> </table>	3	3
3	3				
<p>Year 1</p> <p>Solve one-step problems involving division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher</p>	<p>Sharing and grouping</p> <p>Sharing using a range of objects 6 ÷ 2</p> 	<p>Sharing</p>  <p>Grouping</p> 	<p>2 groups of 5</p> <p>5 5</p> <p>5 groups of 2</p> <p>2 2 2 2 2</p>		

Year 2

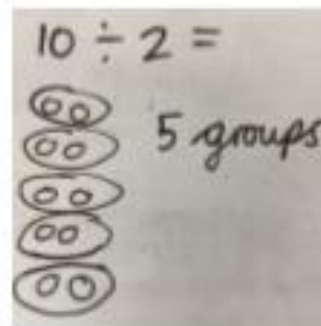
Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs

Solve problems involving multiplication and division, using arrays, repeated addition and multiplication and division facts, including problems in contexts e.g. knowing that $2 \times 7 = 14$ and $2 \times 8 = 16$, explains that making pairs of socks from 15 identical socks will give 7 pairs and one sock will be left

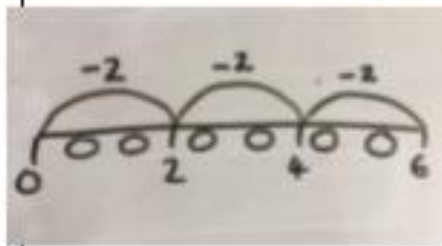
Grouping using equipment



Grouping



Number lines



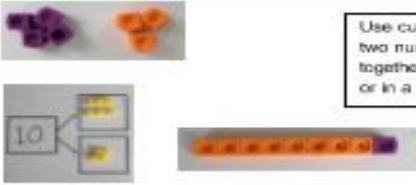




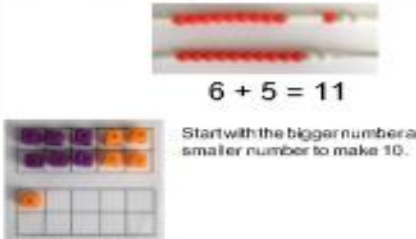
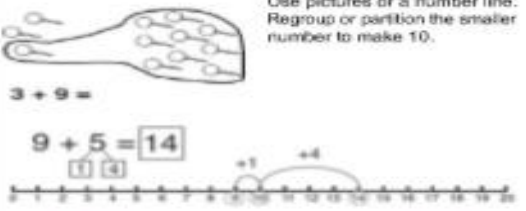

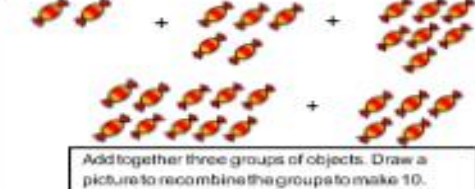
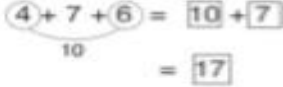
Division number sentences

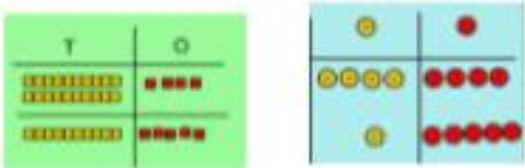
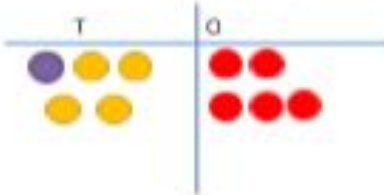
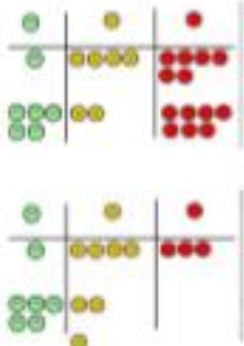
$$10 \div 2 = 5$$

$$10 \div 5 = 2$$









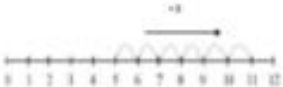


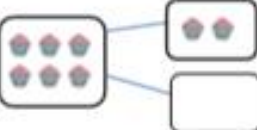
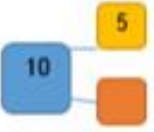


Appendix 1 – Strategies used throughout the school

Addition

Objective and Strategies	Concrete	Pictorial	Abstract
<p>Combining two parts to make a whole: part- whole model!</p>	 <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>	 <p>Use the part-part whole diagram as shown above to move into the abstract.</p> <p>$4 + 3 = 7$ $10 = 6 + 4$</p>
<p>Starting at the bigger number and counting on</p>	 <p>Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.</p>	<p>$12 + 5 = 17$</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>$3 + 9 =$ $9 + 5 = 14$</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>Adding three single digits</p>	<p>$4 + 7 + 6 = 17$</p> <p>Put 4 and 6 together to make 10. Add on 7.</p>  <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>	 <p>Combine the two numbers that make 10 and then add on the remainder.</p> <p>$4 + 7 + 6 = 10 + 7 = 17$</p>

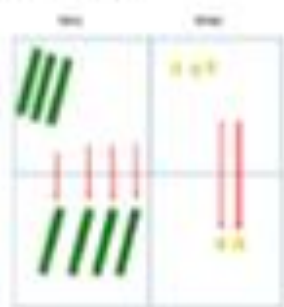
<p>Column method- no regrouping</p>	<p>24 + 15 =</p> <p>Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.</p> 	<p>After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.</p> 	<p>Calculations</p> $21 + 42 =$ $\begin{array}{r} 21 \\ + 42 \\ \hline \end{array}$
<p>Column method- regrouping</p>	<p>Make both numbers on a place value grid.</p>  <p>146 + 527</p> <p>Add up the units and exchange 10 ones for one 10.</p> <p>146 + 527</p> <p>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.</p> <p>This can also be done with Base 10 to help children clearly see that 10 ones equal 1 ten and 10 tens equal 100.</p> <p>As children move on to decimals, money and decimal place value counters can be used to support learning.</p>		

Subtraction

Objective and Strategies	Concrete	Pictorial	Abstract
Taking away ones	<p>Use physical objects, counters, cubes etc to show how objects can be taken away.</p>  $6 - 2 = 4$	<p>Cross out down objects to show what has been taken away.</p>  $15 - 3 = 12$	$18 - 3 = 15$ $8 - 2 = 6$
Counting back	<p>Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.</p> <p>$13 - 4$</p>  <p>Use counters and move them away from the groups 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 digit numbers.</p>	<p>Put 13 in your head, count back 4. What number are you at? Use your fingers to help.</p>
Find the difference	<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 ten frames to find the difference.</p>	 <p>Count on to find the difference.</p> <p>Comparison Bar Models</p> <p>Draw bars to find the difference between 2 numbers.</p>  <p>Use a 10 piece set. How many is 10 away from? Find the difference in age between them.</p>	<p>Scott has 23 sandwiches, Rachel has 15 sandwiches. Find the difference between the number of sandwiches.</p>
Part 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> $10 - 6 =$	<p>Use a pictorial representation of objects to show the part-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 take away 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? How many do we have left to take off?</p>

Column method without regrouping

Use Base 10 to make the bigger number then take the smaller number away.



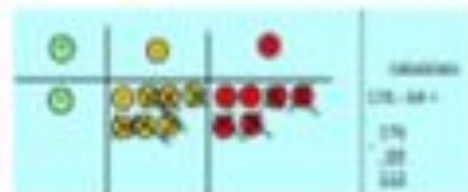
Use Base 10 to make the bigger number then take the smaller number away.



Show how you partition numbers to subtract. Again make the larger number first.

Use Base 10 to start with help in moving on to place value counters.

Draw the Base 10 or place value counters alongside the written calculation to help to show working.





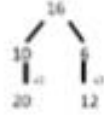
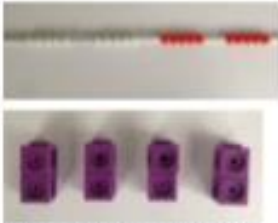
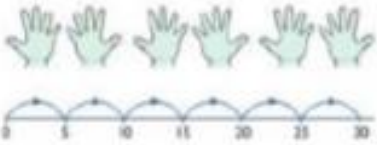









Draw them on a grid to place all the rods and show what you have

$$47 - 24 = 23$$


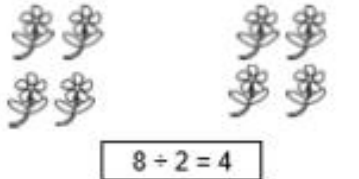
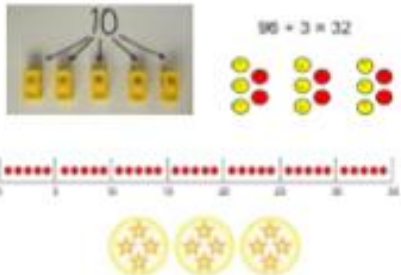
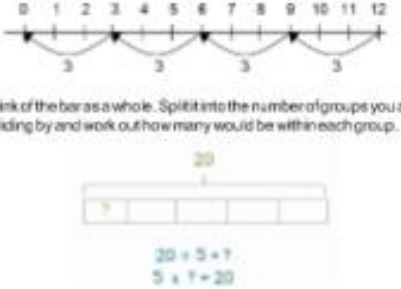

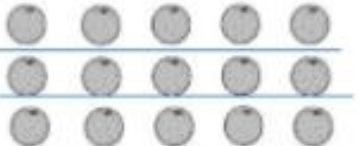
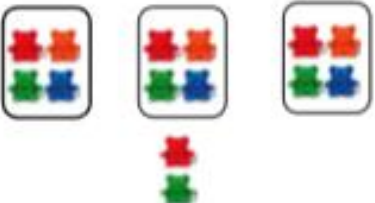
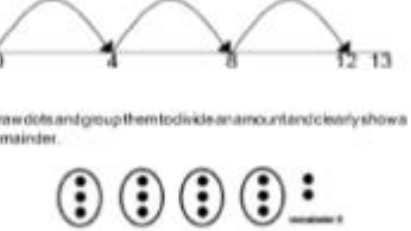

$$\begin{array}{r} 47 \\ - 24 \\ \hline 23 \end{array}$$

This will lead to a clear written column subtraction.

Multiplication

Objective and Strategies	Concrete	Pictorial	Abstract
<p>Doubling</p>	<p>Use practice 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> 
<p>Counting in multiples</p>	 <p>Count in multiples supported by concrete objects in equal groups.</p>	 <p>Use a number line or pictures to continue support in counting in multiples.</p>	<p>Count in multiples of a number aloud.</p> <p>Write sequences with multiples of numbers.</p> <p>2, 4, 6, 8, 10</p> <p>5, 10, 15, 20, 25, 30</p>
<p>Repeated addition</p>	 <p>Use different objects to add equal groups.</p>	<p>There are 3 groups. Each group has 2 stars. How many stars are there?</p>  <p>2 and 2 and 2 equals 6</p>  <p>$5 + 5 + 5 = 15$</p>	<p>Write addition sentences to describe objects and pictures.</p>  <p>$2 + 2 + 2 + 2 + 2 = 10$</p>
<p>Arrays - showing commutative multiplication</p>	 <p>Create arrays using counters/cubes to show multiplication sentences.</p>	<p>Draw arrays in different rotations to find commutative multiplication sentences.</p>  <p>$3 \times 3 = 9$ $3 \times 3 = 9$ $3 \times 3 = 9$</p>	<p>Use an array to write multiplication sentences and reinforce repeated addition.</p>
			 <p>$5 + 5 + 5 = 15$</p> <p>$3 + 3 + 3 + 3 + 3 = 15$</p> <p>$5 \times 3 = 15$</p> <p>$3 \times 5 = 15$</p>

Division

Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	 <p>I have 10 cubes, can you share them equally in 2 groups?</p>	<p>Children use pictures or shapes to share quantities.</p>  $8 \div 2 = 4$	<p>Share 9 buns between three people.</p> $9 \div 3 = 3$
Division as grouping	<p>Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.</p>  $10 \div 2 = 5$ $5 \times 2 = 10$	<p>Use a number line to show jumping groups. The number of jumps equals the number of groups.</p>  $28 \div 7 = 4$	<p>Divide 28 into 7 groups. How many are in each group?</p> $28 \div 7 = 4$
Division within arrays	<p>Link division to multiplication by creating an array and thinking about the number sentences that can be created.</p>  <p>E.g. $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$</p>	 <p>Draw an array and use lines to split the array into groups to make multiplication and division sentences.</p>	<p>Find the inverse of multiplication and division sentences by creating four linking number sentences.</p> $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$
Division with a remainder	<p>Divide objects between groups and see how much is left over.</p>  $14 \div 3 = 4 \text{ remainder } 2$	<p>Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.</p>  <p>Draw dots and group them to divide an amount and clearly show a remainder.</p> 	<p>Complete written divisions and show the remainder using r.</p> $29 \div 8 = 3 \text{ REMAINDER } 5$ <p>↑ ↑ ↑ ↑ dividend divisor quotient remainder</p>

Mathematical Language

High expectations of the mathematical language used are essential, with staff only accepting what is correct. Consistency across the school is key:

Correct Terminology	Incorrect Terminology
ones	units
exchange exchanging regrouping	stealing borrowing
calculation equation	generic term of 'sum' or 'number sentence'
Bar model	
known unknown	
whole part	