



Llangan Primary School Mathematics Calculation Policy March 2023



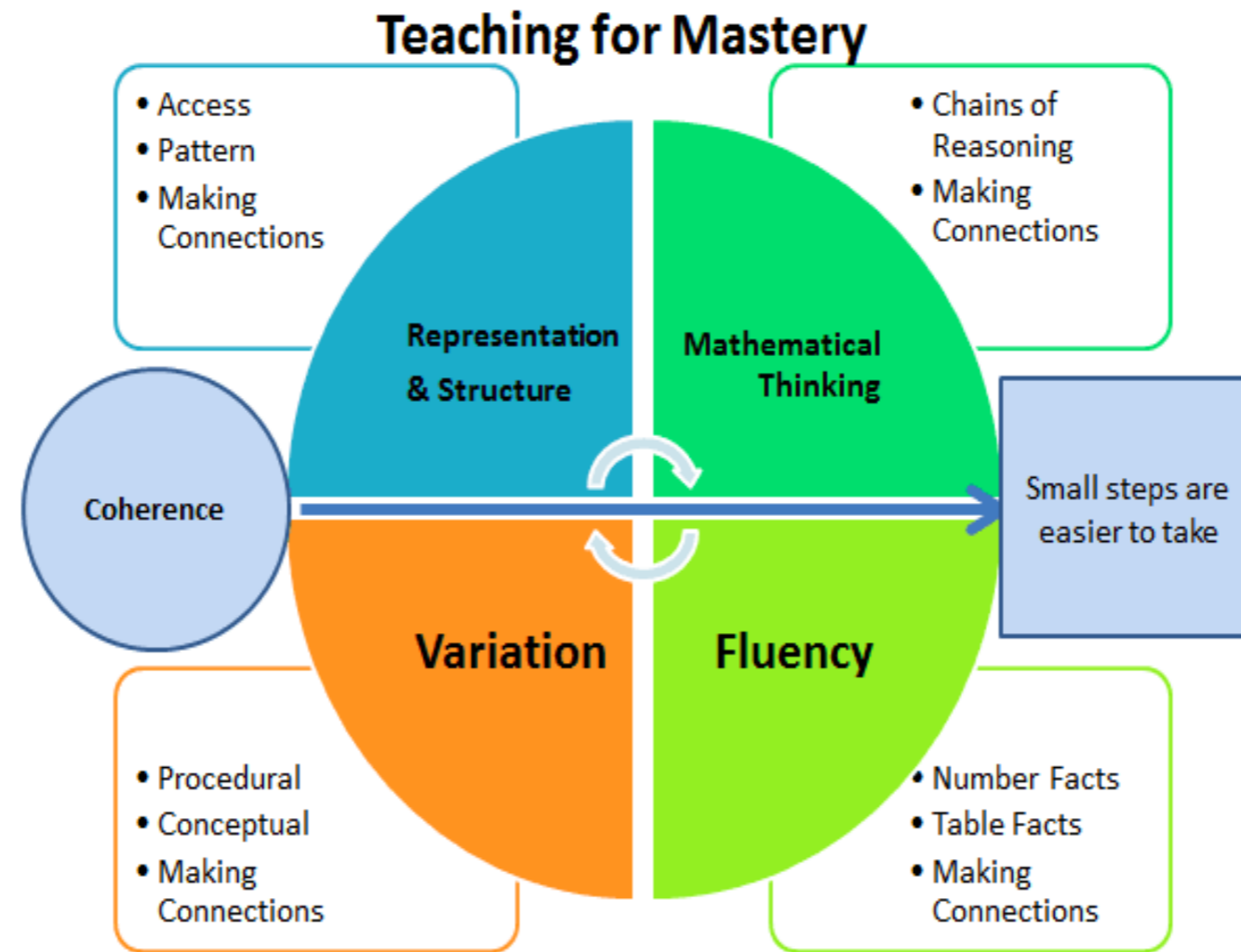
The Calculation Policy has been developed and agreed by our cluster of primary schools. It aligns with our scheme White Rose Maths Hub Calculation Policy, with additional material from Power Maths, and meets the requirements of Curriculum for Wales for the teaching and learning in the mathematics and numeracy AOLE, by an increased emphasis on the five proficiencies and the principles of progression that develop mathematical proficiency.


5 Proficiencies of Curriculum for Wales	Principles of Progression
<ol style="list-style-type: none">1. Conceptual understanding2. Logical reasoning3. Fluency4. Strategic competence5. Communication using symbols	<ul style="list-style-type: none">• Increasing effectiveness as a learner• Increasing breadth and depth of knowledge• Deepening understanding of the ideas and disciplines within areas of learning and experience• Refinement and growing sophistication in the use and application of skills• Making connections and transferring learning into new contexts.

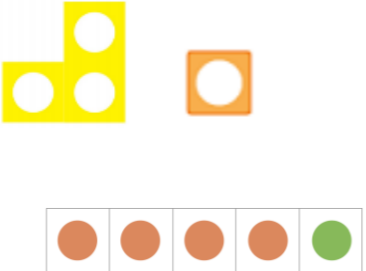




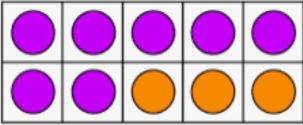
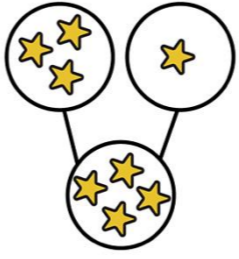

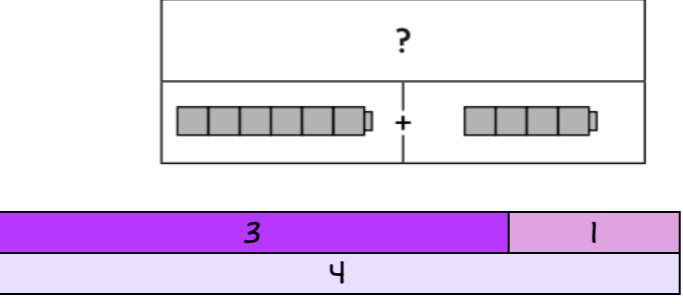

It is designed to provide pupils with a clear and smooth progression of learning through the year groups and ensure that the teaching of calculation methods remains consistent across the 4 operations of addition, subtraction, multiplication and division. The consistent use of the CPA (concrete, pictorial, abstract) approach helps children develop mastery across all the operations in an efficient and reliable way. This policy shows how these methods develop children's confidence in their understanding of both written and mental methods.

The school calculation policy builds progressively from the content and methods established in the nursery, with a recognition that concrete and pictorial representations of problems continue to play a valuable role throughout the stages of a child's development.


Context for calculation It is crucial that children are given real-life contexts and problems in which to use and apply their calculation methods. Children subsequently develop a more secure understanding of the purpose of calculations and learn to choose their operations with accuracy. This is a priority in an increasingly-challenging curriculum, with its focus on mastery. Choosing a calculation method Children must be taught and encouraged to use a simple process in deciding what approach to take to a calculation, ensuring that they select the most appropriate method for the problem, whether mental or written. Children need to be comfortable with a wide variety of strategies and representations in order to demonstrate this.

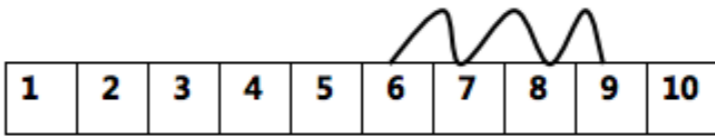
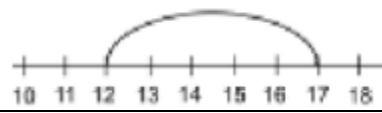

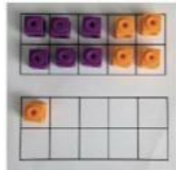
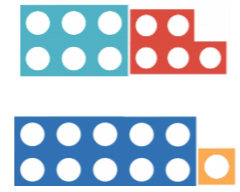

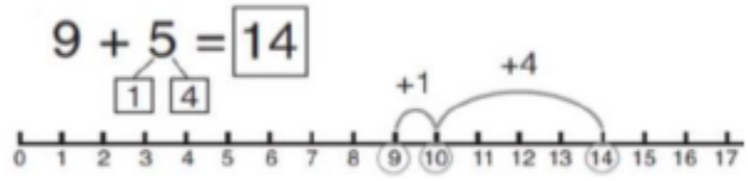
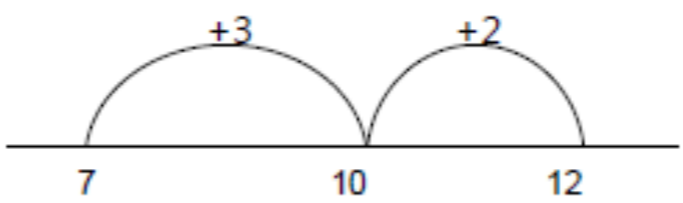


Y5golion - 5schools					
Progression in the teaching of calculations - Add it!					
Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage I PIA	Counting a set of objects. This can include counting using fingers.	One more One less Bigger Larger			

PIB	Knowing 1 more or 1 less. Place numbers in order of size.				
Stage 2 PIA PIB P2A	Combining 2 separate amounts to make 1 whole amount.	Addition Sum Total Parts and wholes Plus Add Altogether More than Equal to Same as	<p>For 4 + 3, count out 4 cubes in one colour then 3 more in another colour and group them together to see what they have altogether.</p>  <p>7 + 1 = 8 can be represented in a bar.</p>   <p>Use a 4 and 3 numicon and place together with a 7 numicon.</p>  <p>Ten frame to build number bonds to 10 e.g. 7 + 3 = 10</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>E.g. $5 + 3 = 8$, or $8 = 5 + 3$ Although number sentences are recorded in the concrete and pictorial methods, the abstract method sees the calculation carried out without the use of concrete or pictorial aids.</p>

Y5golion - 5 Schools
Progression in the teaching of calculations - Add it!

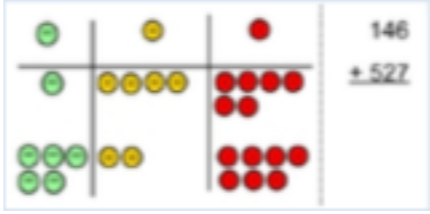
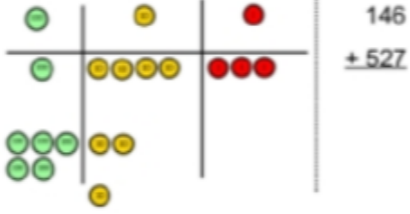
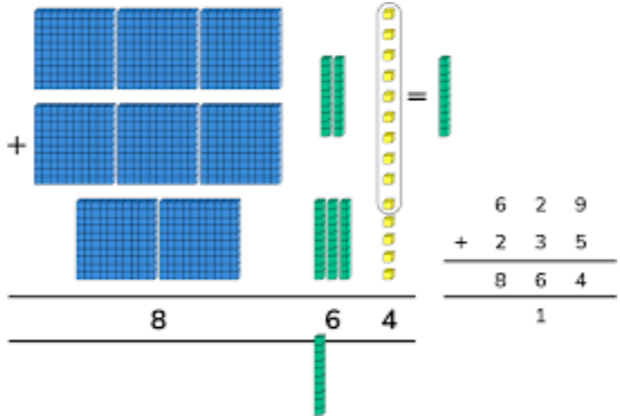
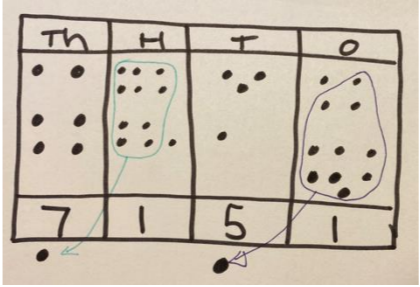
Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 3 P2A	Start at the number and count on.			Counting on in jumps of 1 using a number line with numbers on it. E.g. $6 + 3 = 9$	Place the larger number in your head and count on the smaller number to find your answer. E.g. $5 + 12 = 17$

			<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>Count bigger number and then continue to count number of holes 1 by 1 on next number to find the answer.</p> <p>INCLUDE PICTURE</p> <p>(TEN FRAME?)</p>	 <p>This can also be done in bigger jumps or 1 big jump to find the answer. For $12 + 5 = 17$</p> 	
<p>Stage 4 P2A 'The Magic 10'</p>	<p>Exchanging to make 10 so that the calculation is easier.</p>	<p>Re-group Partition</p>  <p>Exchange $9 + 3$ into $10 + 2$ before adding them together. E.g. $6 + 5 = 11$</p>  <p>Start with the larger number and use the smaller number to make 10.</p> 	<p>E.g. $3 + 9 =$</p>  <p>Use pictures or a number line. Exchange or partition the smaller number to make 10 before adding</p>  <p>Children move on to using an 'empty number line', E.g. $7 + 5$ becomes $7 + 3 + 2$</p> 	<p>If I am at seven, how many of my 5 do I need to make 10? How many more do I still need to add on now?</p> <p>E.g. $7 + 5 = 7 + 3 + 2 = 12$</p>	


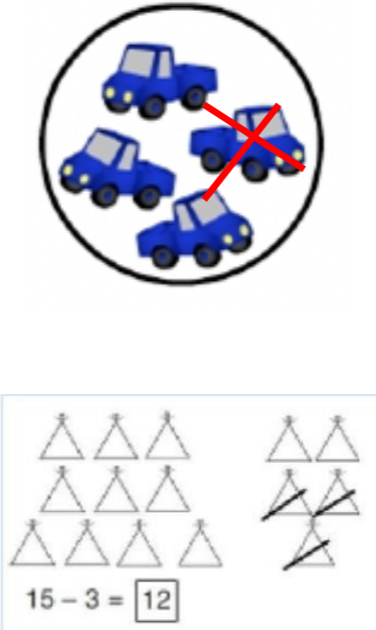

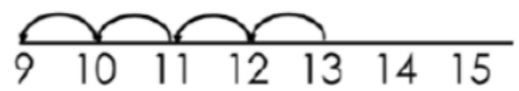
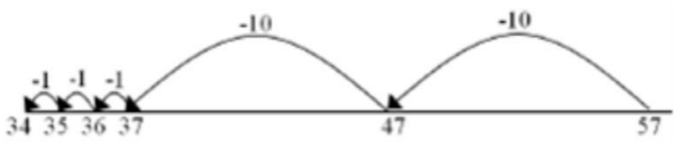
Y5golion - 5schools
Progression in the teaching of calculations - Add it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
--------------	--------	----------------------------------	---------------------	-----------------------	-----------------------

Y5golion – 5 Schools
Progression in the teaching of calculations – Add it!


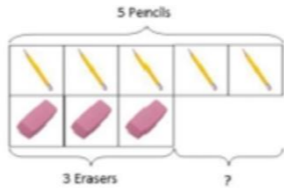

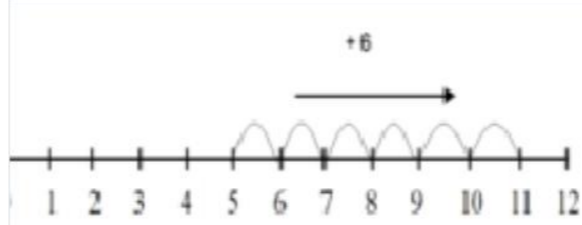
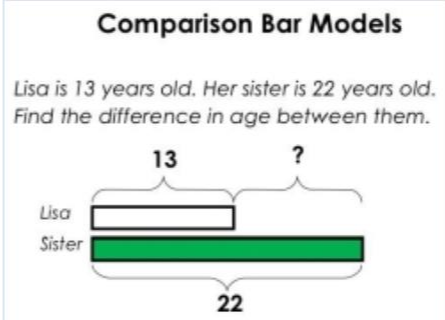
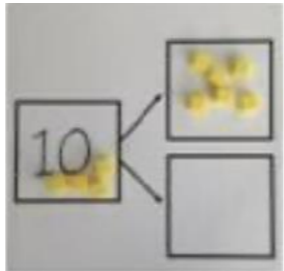
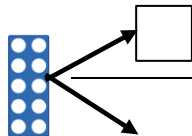
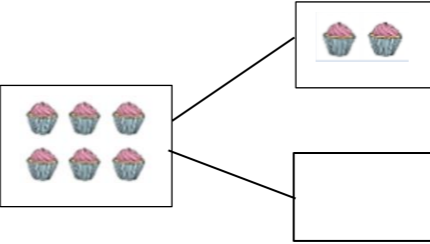
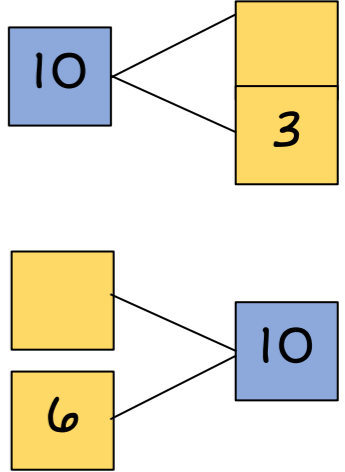
Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
<p>Stage 7</p> <p>P2C (3 digits)</p> <p>P3A (4 digits)</p> <p>P3B (>4 digits and decimal s with same number of decimal places)</p> <p>P3C (decimal s with differen t number of decimal places)</p>	<p>Column addition with exchanging.</p>	<p>Exchange</p> <p>Regroup</p> <p>Partition</p>	<p>Make both numbers with place value counters, base 10 or numicon.</p>  <p>Add the ones and exchange 10 ones for one 10. Add it to the other tens:</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>As children move on to decimals, money and decimal place value counters can be used to support learning.</p> 	<p>Children can draw a pictorial representation of columns and place value counters to further support their learning and understanding.</p> 	<p>E.g.</p> $\begin{array}{r} 76 \\ + 47 \\ \hline 123 \\ \hline \end{array}$ <p>As the children move on, introduce decimals with and without the same number of decimal places. Money can also be used here.</p> <p>E.g.</p> $\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \\ \hline \end{array}$ <p>E.g.</p> $\begin{array}{r} 59.77 \\ 23.36 \\ 9.08 \\ + 1.30 \\ \hline 93.51 \\ \hline \end{array}$ <p>N.B. Exchanged digits need to be recorded below the line when adding.</p>

Y5golion – 5schools
Progression in the teaching of calculations – Subtract it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 1 PIA PIB P2A	One less than. Taking away ones.	One less Take away Less than Difference Subtract Minus Fewer Decrease	Use physical objects, counters, cubes, numicon, etc. to show how objects can be taken away.  <p style="text-align: center;">$5 - 2 = 3$ $5 - 1 =$</p>	Cross out drawn objects to show what has been taken away. E.g. $4 - 1 =$ 	E.g. $8 - 2 = 16$ E.g. $18 - 3 = 15$ Although number sentences are recorded in the concrete and pictorial methods children are introduced to them on their own while encouraging them to mentally take away ones.
Stage 2 PIB P2A P2B	Counting back.	One less Take away Less than Difference Subtract Minus Fewer Decrease	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones. E.g. $13 - 4 = 9$  Use counters, numicon, objects and move them away from the group as you take them away counting backwards as you go.	Count back on a number line or number track.  Start at the bigger number and count back the smaller number showing the jumps on the number line.  This can progress all the way to counting back using two 2 digit numbers.	E.g. $13 - 4$, put 13 in your head and count back 4. What number are you at? Use your fingers to help.



Y5golion – 5 Schools
Progression in the teaching of calculations – Subtract it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 3 P2A P2B	Find the difference	One less Take away Less than Difference Subtract Minus Fewer Decrease	Compare amounts and objects to find the difference.  Use cubes to build towers or make bars to find the difference.  Use basic bar models with items to find the difference.  Use numicon to find the difference by laying the 5 on top of the 8 and count the difference.	Count on to find the difference:  What is the difference between 5 and 11? Draw bars to find the difference between two numbers. 	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches. Children use their own methods to solve the problem.
Stage 4 P2A P2B	Part Whole Model.	Part Whole Inverse	Link addition – use the part whole model to help explain the inverse between addition and subtraction.  	Use a pictorial representation of objects to show the part whole model. E.g. $6 - 2 = 4$ 	


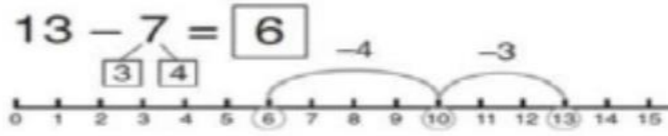
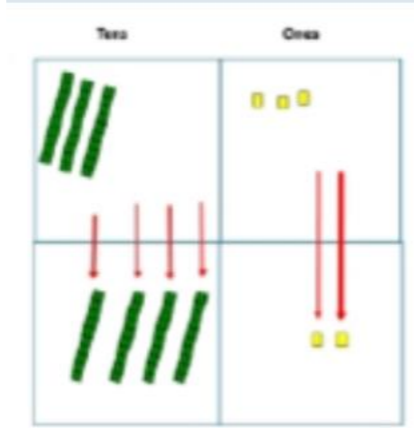
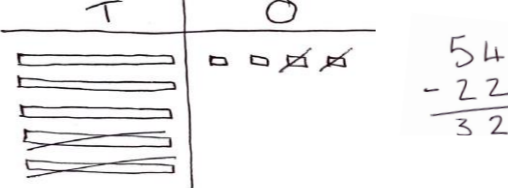


If 10 is the whole and 6 is one of the parts.
What is the other part?

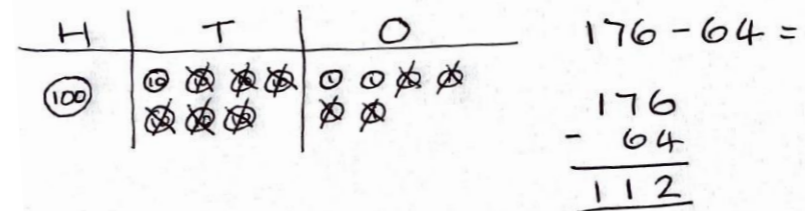
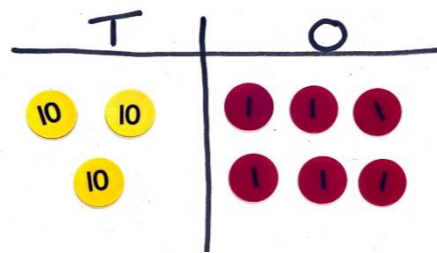
$$10 - 6 = \square$$

Move to using numbers within the part whole model.

Y5golion – 5 Schools
Progression in the teaching of calculations – Subtract it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!																									
Stage 5 P2A P2B	Make 10	Ten frame Remaining Take off Count back	E.g. $14 - 5 =$  Make 14 on the tens frame. Take away 4 first to make 10 and then take away one more so you have taken away 5. You are left with the answer of 9.	Start at 13. Count back 3 to reach 10. Then count back the remaining 4 so you have taken away 7 altogether. You have reached your answer. 	E.g. $16 - 8 =$ How many do we take off to reach the previous 10? 6 How many do we have left to take off? 2																									
Stage 6 P2B	Column subtraction without exchanging.	Column Partition Larger	Use base 10 to make the bigger number then take the smaller number away. E.g. $75 - 42 =$  Show how you partition numbers to subtract, again make the larger number first and take smaller number away.	Draw the Base 10 or place value counters alongside the written calculation to help to show workings: E.g. $54 - 22 =$  E.g. $176 - 64 =$	Partitioned numbers are written vertically: E.g. $54 - 22 =$ <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>Tens</td> <td>Ones</td> <td></td> </tr> <tr> <td></td> <td>50</td> <td>4</td> <td></td> </tr> <tr> <td>-</td> <td>20</td> <td>2</td> <td></td> </tr> <tr> <td></td> <td>30</td> <td>2</td> <td>= 32</td> </tr> </table> This will lead to clear written column subtraction: E.g. $75 - 12 =$ <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>T</td> <td>O</td> </tr> <tr> <td></td> <td>7</td> <td>5</td> </tr> <tr> <td>-</td> <td>1</td> <td>2</td> </tr> </table>		Tens	Ones			50	4		-	20	2			30	2	= 32		T	O		7	5	-	1	2
	Tens	Ones																												
	50	4																												
-	20	2																												
	30	2	= 32																											
	T	O																												
	7	5																												
-	1	2																												

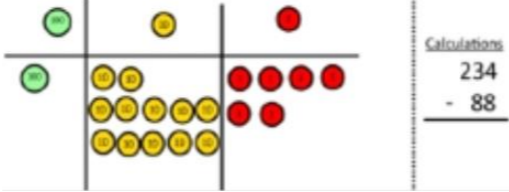
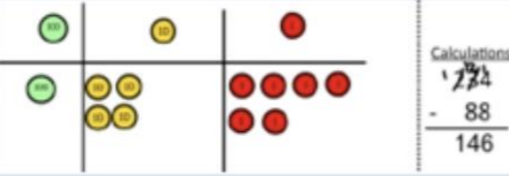
E.g. $36 - 14 =$



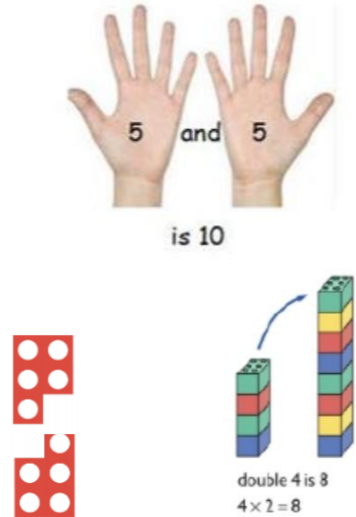
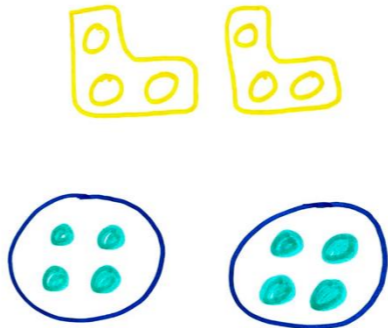
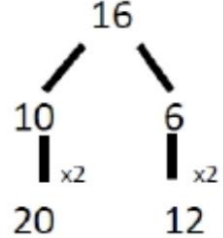

6 3





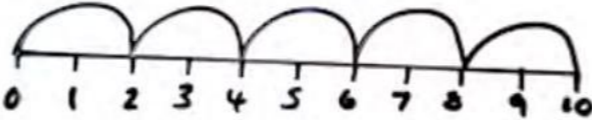
Y5golion - 5schools
Progression in the teaching of calculations - Subtract it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
<p>Stage 7</p> <p>P2C (3 digits)</p> <p>P3A (4 digits)</p> <p>P3B (>4 digits and decimals with same number of decimal places)</p> <p>P3C (decimals with different number of decimal places)</p>	<p>Column subtraction with exchanging.</p>	<p>Exchange</p> <p>Partition</p>	<p>Using Base 10 or place value counters, start with one exchange before moving onto subtractions with 2 exchanges.</p> <p>Make the larger number with the Base 10 or place value counters.</p> <p>Start with the ones, can I take away 8 ones from 4 ones easily? I can't take away 8 ones. I need to exchange one of my tens for ten ones.</p> <p>Now I can subtract 8 ones from 14 ones. Next look at the tens. I can't take away 8 tens from 2 tens. I need to exchange 1 hundred for 10 tens:</p>	<p>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:</p> <p>When confident, children can find their own way to record the exchange:</p>	<p>Children use formal written method, clearly showing where any exchanging has taken place.</p> <p>$728 - 582 = 146$</p> <p>As the children move on, introduce decimals with and without the same number of decimal places. Money can also be used here.</p> <p>$263 - 26.5 = 236.5$</p>


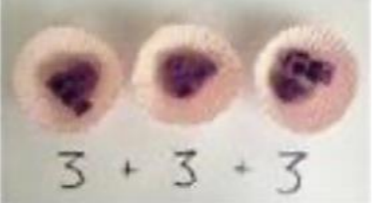


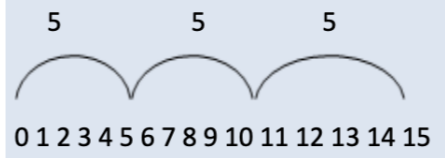


			 <p>Calculations 234 - 88 ----- 146</p> <p>Now I can take 8 tens from the 12 tens and complete the subtraction.</p>  <p>Calculations 234 - 88 ----- 146</p> <p>Show children how the concrete method links to the written method alongside their workings. Cross out the numbers when exchanging and show where we write our new amount.</p>	Just writing the numbers as shown here shows that the child understands the method and knows when to exchange.	
--	--	--	--	--	--


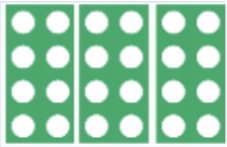


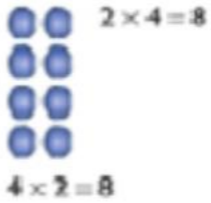
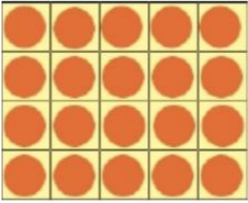

Y5golion – 5schools
Progression in the teaching of calculations – Multiply it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 1 PIB P2A P2B	Doubling	Double Count on (from, to) Count back (from, to) Count in ones, twos, tens... Is the same as	Use practical activities to show how to double a number. 	Draw pictures to show how to double a number. 	Partition a number and then double each part before recombining it back together.  <p>E.g. $4 \times 2 = 8$ $2 \times 4 = 8$ $8 = 4 \times 2$ $8 = 2 \times 4$</p>
Stage 2 PIB P2A P2B	Counting in multiples	Multiplied by The product of Groups of Lots of Is equal to	Count in multiples supported by concrete objects in equal groups. 	Use a number line or pictures to continue with support in counting multiples.	Count out loud in multiples of a number. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25, 30

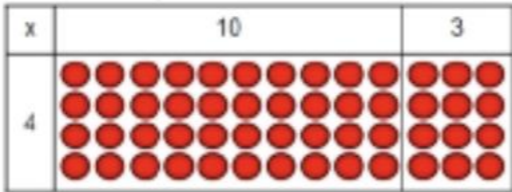
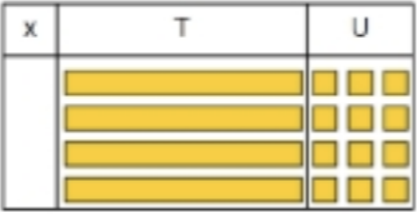
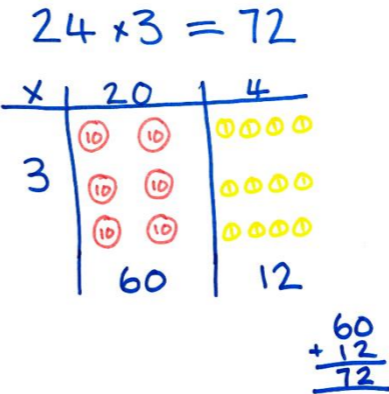
P2C			  5 10 15	  	
-----	--	--	---	---	--

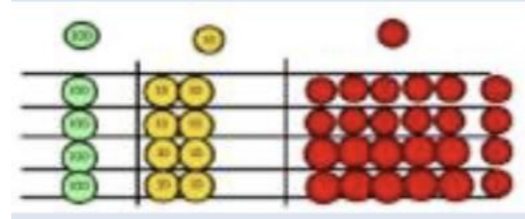
Y5golion – 5schools
Progression in the teaching of calculations – Multiply it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 3 P2B P2C	Repeated addition	One less Take away Less than Difference Subtract Minus Fewer Decrease	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?  $2 + 2 + 2 = 6$. Repeated addition can be shown on a labelled or empty number line. Eg. $5 + 5 + 5 = 15$;  Begin to relate repeated addition to multiplication using 'lots of'; Eg. 3 lots of 5 = 15 	Write addition sentences to describe objects and pictures.  $2 + 2 + 2 + 2 + 2 = 10$ This then leads to writing related multiplication sentences. E.g. $5 \times 2 = 10$, $2 \times 5 = 10$.
Stage 4 P2B	Arrays – showing commutative	Array Commutative	Create arrays using counters, cubes, numicon to show multiplication sentences. E.g. $4 \times 6 = 24$	Draw arrays in different rotations to find commutative multiplication sentences.	Use an array to write multiplication sentences and reinforce repeated addition.

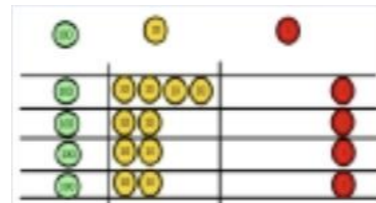
P2C	ive multiplica tion		 <p>E.g. $3 \times 8 = 24$</p>  <p>E.g. $5 \times 3 = 15$ and $3 \times 5 = 15$ (communtativity)</p> 	 <p>$4 \times 2 = 8$</p> <p>$2 \times 4 = 8$</p>  <p>$2 \times 4 = 8$</p> <p>$4 \times 2 = 8$</p> <p>Link arrays to area of rectangles:</p> 	 <p>E.g. $5 + 5 + 5 = 15$ or $15 = 5 + 5 + 5$ $3 + 3 + 3 + 3 + 3 = 15$ or $15 = 3 + 3 + 3 + 3 + 3$ $5 \times 3 = 15$ or $15 = 5 \times 3$ $3 \times 5 = 15$ or $15 = 3 \times 5$.</p>
-----	---------------------------	--	---	---	--

Y5golion – 5 Schools
Progression in the teaching of calculations – Multiply it!

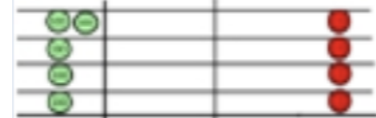
Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!						
Stage 5 P2C	Grid Method	Grid Exchange	<p>Show the link with arrays to first introduce the grid method. E.g. 4×13 would be the same as 4 rows of 10; 4 rows of 3</p>  <p>Move on to using Base 10 to move towards a more compact method:</p>  <p>Move on to place value counters to show how we are finding groups of a number. Here we are multiplying 126 by 4 so we need 4 rows with each containing 126.</p>	<p>Children can represent the work they have done with place value counters or Base 10 in a way that they understand.</p> <p>They can draw the counters, Base 10 using colours to show different amounts or just use circles, bars in the different columns to show their thinking as shown below:</p> <p>E.g. $24 \times 3 =$</p>  <p>E.g. $35 \times 4 =$</p>	<p>Start with multiplying 2 – digit by 1 – digit numbers and showing the addition alongside the grid: E.g. $7 \times 35 =$</p> <table border="1" data-bbox="2398 1146 2718 1234"> <tr> <td>x</td> <td>30</td> <td>5</td> </tr> <tr> <td>7</td> <td>210</td> <td>35</td> </tr> </table> <p>$210 + 35 = 245$</p>	x	30	5	7	210	35
x	30	5									
7	210	35									



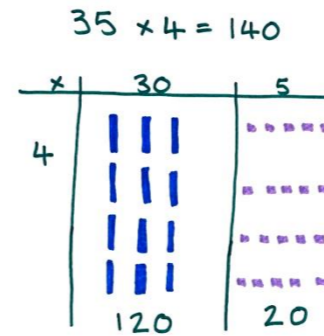
Add up each column, starting with the ones exchanging where needed.



Then regroup the tens.



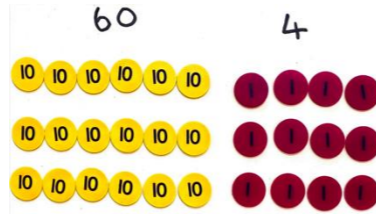
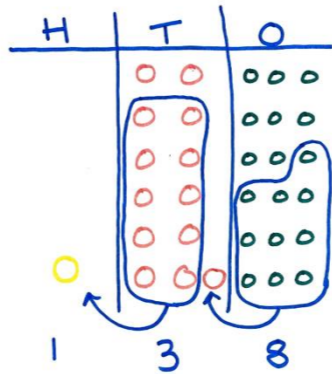
Then you have your answer.

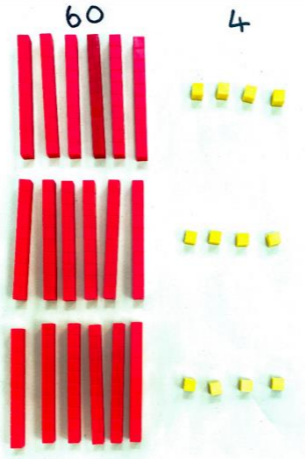
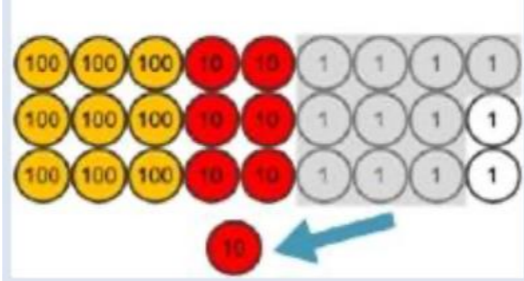
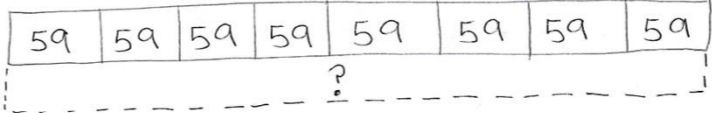


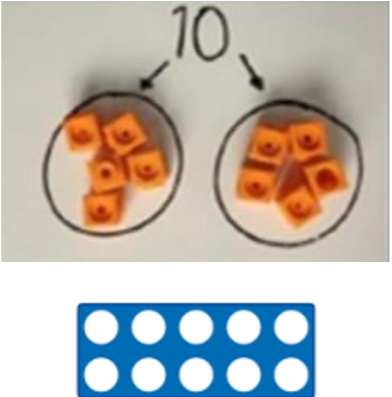

$$\begin{array}{r} 120 \\ + 20 \\ \hline 140 \end{array}$$


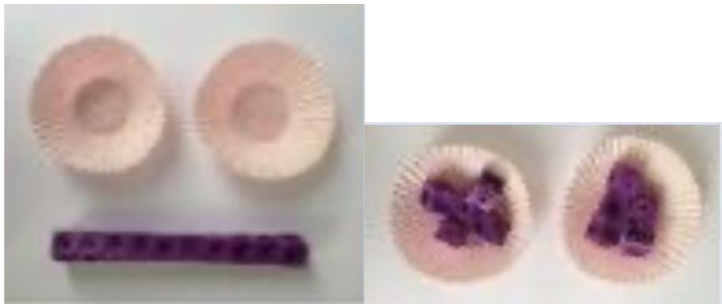
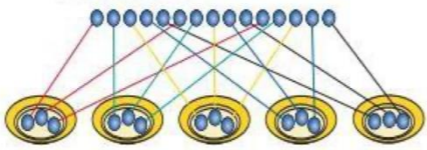
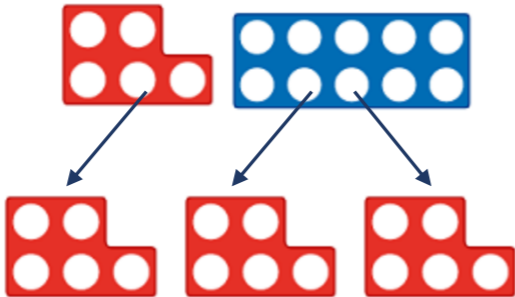

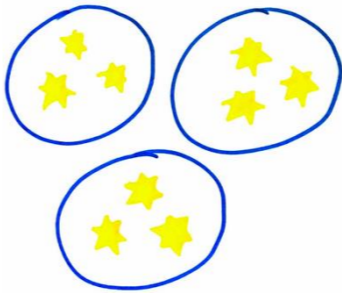
Y5golion - 5schools

Progression in the teaching of calculations - Multiply it!

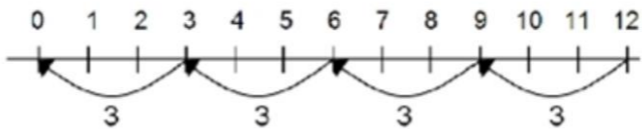
Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 6 P3A (2 digit x 1 digit) P3B (3 digit x 1 digit) P3C (2 and 3 digit x 2 digit)	Column multiplication	Column multiplication	<p>Children can continue to be supported by place value counters, Base 10 for carrying out column multiplication. They can partition and record each calculation vertically.</p> <p>E.g. $3 \times 64 =$</p>  <p>$3 \times 4 = 12$ $3 \times 60 = 180$</p>	<p>As with stage 4, children can represent the work they have done with place value counters, Base 10 in a way that they understand.</p> <p>They can draw the counters or Base 10, using colours to show different amounts or just use circles or bars/blocks in the columns to show their thinking. Exchanging should be made clear.</p> <p>E.g. $6 \times 23 =$</p>  <p>Bar modelling and number lines can support learners when solving problems with</p>	<p>Moving on to the formal written method.</p> <p>E.g. $6 \times 23 =$</p> $\begin{array}{r} 23 \\ \times 6 \\ \hline 138 \\ 11 \end{array}$ <p>E.g. $124 \times 26 =$</p> $\begin{array}{r} 124 \\ \times 26 \\ \hline 744 \\ 2480 \\ \hline 3224 \\ 11 \end{array}$




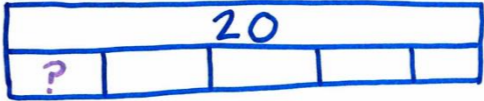
			 <p>It is important at this stage that they always multiply the ones first and note down their answers followed by the tens which they note below.</p> <p>The idea of regrouping will support them in moving on to a more compact method: E.g. $3 \times 324 =$</p> 	<p>multiplication alongside the formal written method. E.g. $59 \times 8 =$</p>  8×59 $= 8 \times 60 - 8$ $8 \times 6 = 48$ $8 \times 60 = 480$ $480 - 8 = 472$	
--	--	--	---	--	--

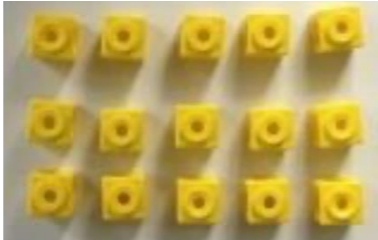
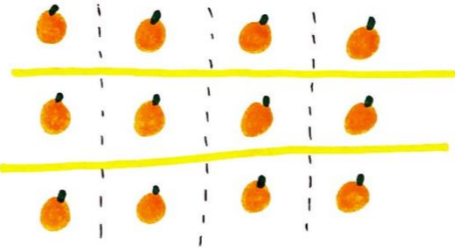
Y5golion – 5 Schools					
Progression in the teaching of calculations – Divide it!					
Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 1 PIB	Halving	Half Halve Count out Share out Left Left over ...is the same as. Equal		<p>One sweet for you, one for me... Is it fair? How many do we have each?</p> 	Not Applicable

					
Stage 2 PIB P2A	Sharing objects equally	Share Group Divide Half Halve Count out Share out Left Left over Is the same as Is equal to	<p>I have 10 cubes; can you share them equally into 2 groups?</p>  <p>15 shared between 5 is 3:</p>  	<p>Children use pictures or shapes to share quantities.</p> <p>E.g. $8 \div 2 = 4$</p>  <p>How many groups of 4 are there in 12 stars?</p> 	Share 9 buns between 3 people: $9 \div 3 = 3$

Y5golion – 5 Schools
Progression in the teaching of calculations – Divide it!

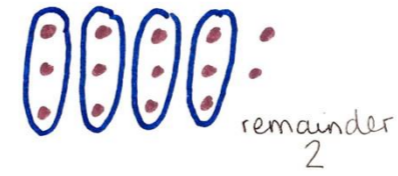
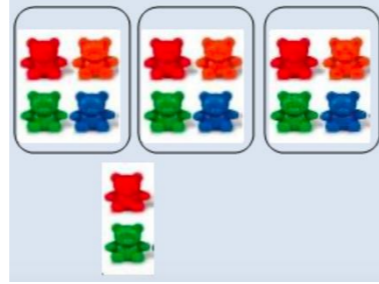
Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 3 P2A P2B	Division as grouping	Equal groups	<p>Divide quantities into equal groups. Use cubes, counters, objects, Base 10 or place value counters to aid understanding.</p> <p>E.g. There are 10 sweets. How many people can have 2 sweets each?</p>	<p>Use a number line to show jumps in groups. The number of jumps equals the number of groups. Number line shows repeated subtraction.</p> 	<p>E.g. $28 \div 7 = 4$ Divide 28 into 7 groups. How many are in each group?</p>

			 <p>E.g. $12 \div 3 = 4$</p>  <p>E.g. $96 \div 3 = 32$</p> 	<p>Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many you would have in each group.</p>  <p>$20 \div 5 = ?$ $5 \times ? = 20$</p>	
--	--	--	--	---	--

Stage 4 P2B P2C P3A	Division with arrays	Array Inverse	<p>Link division to multiplication by creating an array and thinking about the number sentences that can be created:</p>  <p>E.g.</p> $15 \div 3 = 5 \quad 5 \times 3 = 15$ $15 \div 5 = 3 \quad 3 \times 5 = 15$	<p>Draw an array and use lines to split the array into groups to make multiplication and division sentences.</p>  <p>E.g.</p> $12 \div 3 = 4 \quad 4 \times 3 = 12$ $12 \div 4 = 3 \quad 3 \times 4 = 12$	<p>Find the inverse of multiplication and division sentences by creating four linking sentences.</p> <p>E.g.</p> $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$
--	----------------------	---------------	---	--	--

Y5golion – 5 schools
Progression in the teaching of calculations – Divide it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!
Stage 5 P2C P3A	Division with a remainder	Remainder Equal jumps	<p>E.g. $14 \div 3 =$</p> <p>Divide objects into groups or share equally and see how many are left over:</p>	<p>Draw dots and group them to divide an amount and clearly show a remainder:</p> <p>E.g. $14 \div 3 =$</p>	<p>Children use knowledge of times table facts to quickly calculate divisions involving remainders.</p> <p>E.g. $27 \div 5 = 5 \text{ r}2$</p>



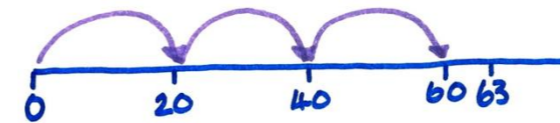
Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder.

E.g. $13 \div 4 = 3 \text{ r}1$



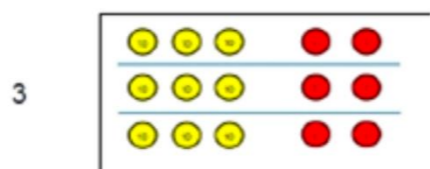


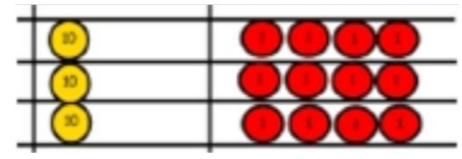
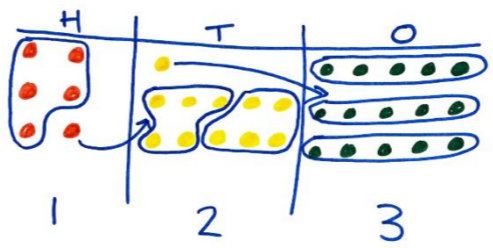
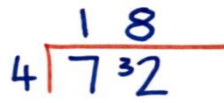
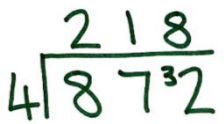

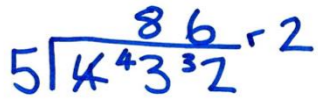
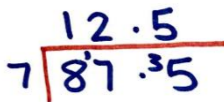
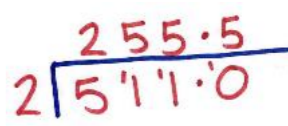
As knowledge of place value improves, children can begin to jump in multiples of 10:

E.g. $63 \div 2 = 30 \text{ r}3$



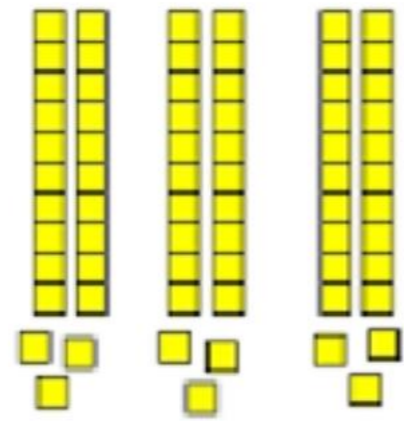
Go on to combining knowledge of times tables with place value to calculate more difficult divisions.
E.g. $137 \div 4 = 34 \text{ r}1$

Y5golion – 5schools
Progression in the teaching of calculations – Divide it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!						
<p>Stage 6</p> <p>P2C (2 digit by 1 digit)</p> <p>P3A (up to 3 digits by 1 digit)</p> <p>P3B (up to 4 digits by 1 digit remainder. Interpret remainder based on context.)</p>	<p>Short division</p>	<p>Bus stop method</p>	<p>Use place value counters to divide using the bus stop method alongside: E.g. $96 \div 3 = 32$</p> <div style="text-align: center;"> <table border="0"> <tr> <td></td> <td>Tens</td> <td>Units</td> </tr> <tr> <td></td> <td>3</td> <td>2</td> </tr> </table>  <p>E.g. $42 \div 3 =$</p>  <p>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:</p>  <p>We exchange this ten for ten ones and then share the ones equally among the groups:</p>  <p>We look at how much is in 1 group to find the answer is 14.</p> </div>		Tens	Units		3	2	<p>Children can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups.</p> <p>E.g. $615 \div 5 = 123$</p>  <p>Encourage them to move towards counting in multiples to divide more efficiently.</p>	<p>Begin with divisions that divide equally with no remainders: E.g. $72 \div 4 = 18$</p>  <p>E.g. $872 \div 4 = 218$</p>  <p>Move onto divisions with a remainder: E.g. $65 \div 4 = 16 \text{ r}1$</p>  <p>E.g. $432 \div 5 = 86 \text{ r}2$</p>  <p>Finally move into decimal places to divide the total accurately. E.g. $87.5 \div 7 = 12.5$</p>  <p>E.g. $511 \div 2 = 255.5$</p> 
	Tens	Units									
	3	2									

Y5golon – 5schools
Progression in the teaching of calculations – Divide it!

Stage/P S	Method	New Vocabular y Say it!	Concrete Use it!	Pictorial Draw it!	Abstract Solve it!																
<p>Stage 7</p> <p>P3C (up to 4 digits by 2 digit remainder. Interpret remainders as whole numbers, fractions or round)</p>	<p>Long division</p>		<p>Children that are ready to progress to stage 7 should be taught using pictorial and abstract methods.</p> <p>If needed this will demonstrate the steps used in long division, using smaller numbers: E.g. $71 \div 3 = 23 \text{ r}2$ Using Base 10 or place value counters, we start with 7 tens and 1 one, to be divided into 3 groups. We can put 2 tens in each group, so we write a 2 in the tens column. In all, we've put 6 tens into the groups (3 x 2 tens), so we write 60 below. We are left with 11 (1 ten and 1 one). We will need to exchange the ten for 10 ones so we can put 3 ones in each group (using 9 ones in all), and we will have a remainder of 2.</p>	<p>It is recommended that instead of using physical counters, children can draw the counters and circle the groups on a whiteboard or in their books. Use this method to explain, however, as soon as the children understand this method move on to the abstract method: E.g. $2544 \div 12 = 212$</p> <table border="1" style="margin-bottom: 10px;"> <tr><th>1000s</th><th>100s</th><th>10s</th><th>1s</th></tr> <tr><td>●●</td><td>●●●●●●</td><td>●●●●●●</td><td>●●●●●●</td></tr> </table> <p>We can't group 2 thousands into groups of 12 so we have to exchange them.</p> $\begin{array}{r} 0 \ 2 \\ 1 \overline{) 2 \ 2 \ 1 \ 4} \\ \underline{2 \ 4} \\ 1 \end{array}$ <table border="1" style="margin-bottom: 10px;"> <tr><th>1000s</th><th>100s</th><th>10s</th><th>1s</th></tr> <tr><td></td><td>●●●●●●●●</td><td>●●●●●●</td><td>●●●●●●</td></tr> </table> <p>We can group 24 hundreds into groups of 12 which leaves 1 hundred. After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens.</p> $\begin{array}{r} 0 \ 2 \ 1 \\ 12 \overline{) 2 \ 2 \ 1 \ 2} \\ \underline{2 \ 4} \\ 1 \ 4 \\ \underline{1 \ 2} \end{array}$	1000s	100s	10s	1s	●●	●●●●●●	●●●●●●	●●●●●●	1000s	100s	10s	1s		●●●●●●●●	●●●●●●	●●●●●●	<p>E.g. $6365 \div 20 = 318 \text{ r}5$</p> $\begin{array}{r} 0 \ 3 \ 1 \ 8 \ \text{r}5 \\ 20 \overline{) 6 \ 3 \ 6 \ 5} \\ \underline{-6 \ 0} \quad \downarrow \\ 3 \ 6 \\ \underline{-2 \ 0} \quad \downarrow \\ 1 \ 6 \ 5 \\ \underline{-1 \ 6 \ 0} \\ 5 \end{array}$ <p>Complete division with remainders, fractions and decimals. E.g. $432 \div 15 = 28 \text{ r}12$</p> $\begin{array}{r} 2 \ 8 \ \text{r}12 \\ 1 \ 5 \overline{) 4 \ 3 \ 2} \\ \underline{3 \ 0 \ 0} \\ 1 \ 3 \ 2 \\ \underline{1 \ 2 \ 0} \\ 1 \ 2 \end{array}$ <p>E.g. $432 \div 15 = 28 \frac{4}{5}$</p> $\begin{array}{r} 2 \ 8 \\ 1 \ 5 \overline{) 4 \ 3 \ 2} \\ \underline{3 \ 0 \ 0} \quad 15 \times 20 \\ 1 \ 3 \ 2 \\ \underline{1 \ 2 \ 0} \quad 15 \times 8 \\ 1 \ 2 \end{array}$ $\frac{12}{15} = \frac{4}{5}$ <p>E.g. $432 \div 15 = 28.8$</p>
1000s	100s	10s	1s																		
●●	●●●●●●	●●●●●●	●●●●●●																		
1000s	100s	10s	1s																		
	●●●●●●●●	●●●●●●	●●●●●●																		



1000s	100s	10s	1s
●●	●●●●●●	●●●●●●	●●●●●●

1000s	100s	10s	1s
	●●●●●●●●	●●●●●●	●●●●●●

