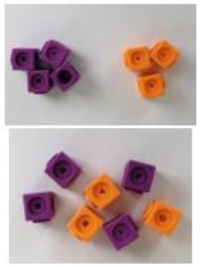
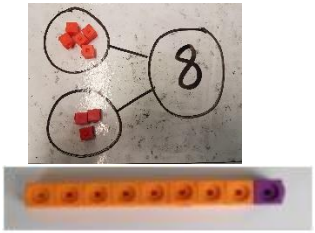
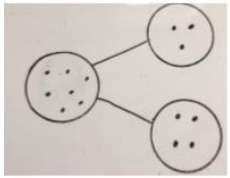
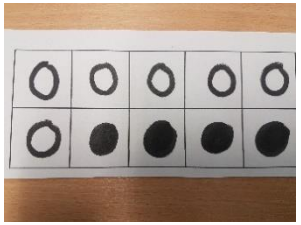
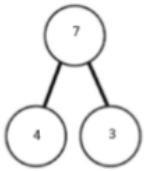
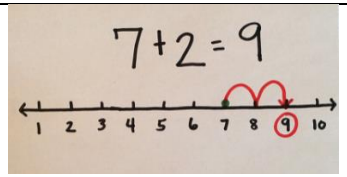
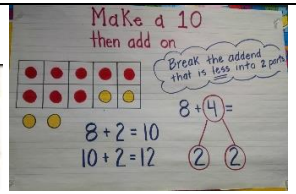
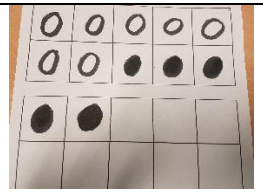
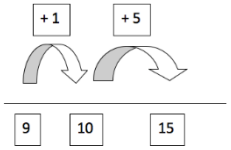
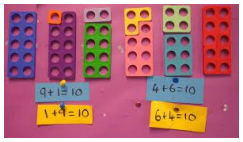
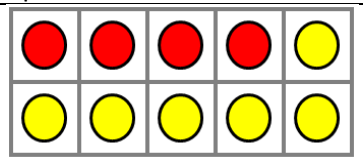
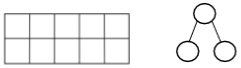
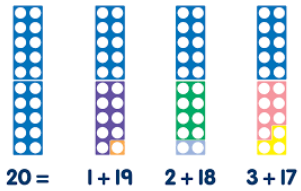
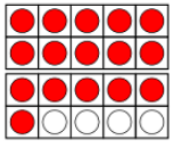
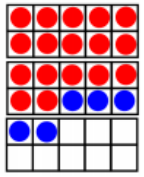
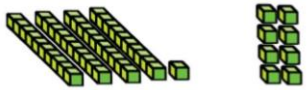
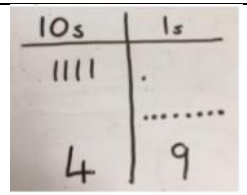
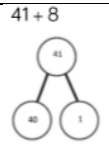
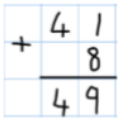
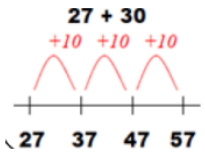
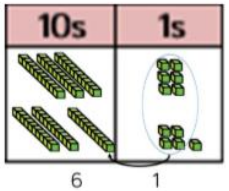
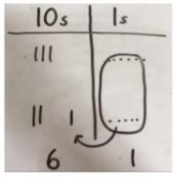
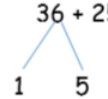
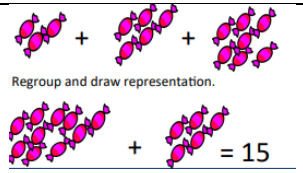
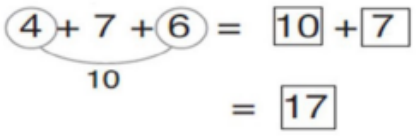
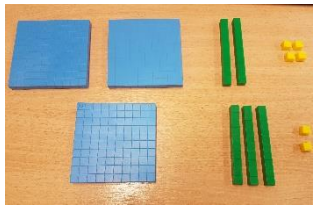
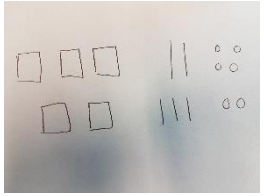
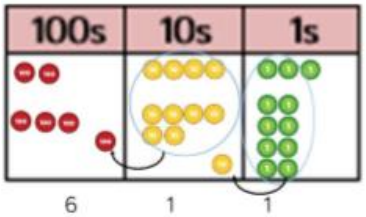
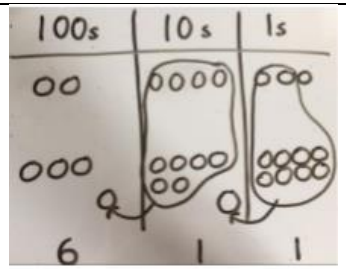
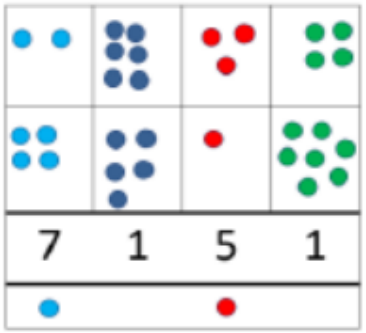
Maryland Primary School Calculation Policy

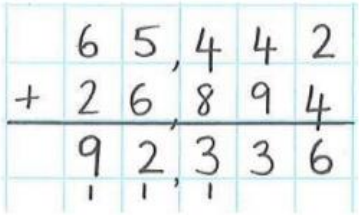
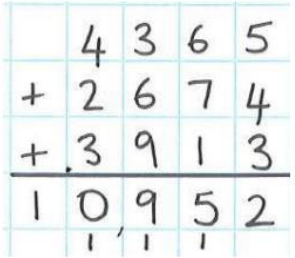
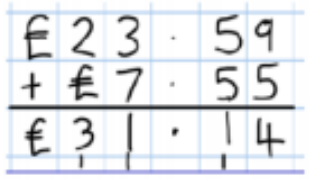
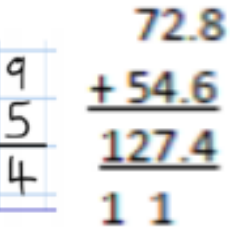
Year 1 addition			
Objective	**Concrete**	**Pictorial**	**Abstract**
Combining parts to make a whole: part, part whole	  Use cubes and objects to add two numbers together in a group or in a bar.	  Draw diagrams of the part, part whole structure.	4 + 3 =7 3 + 4 = 7  Work out simple one-digit add one-digit additions mentally.
Counting on	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	 Start with the larger number on a number line and count on.	**4 + 7 = 11** Place the larger number in your head and count on the smaller number to find the answer.
Regrouping to make 10	  Start at the larger number and break the smaller number up, bridging through 10.	 Draw on to a tens frame, starting with the larger number and breaking the smaller one up.	 Start with the larger number and break up the smaller one to make 10 on a number line, moving on to doing this in your head.
Recognise and recall number bonds of single digit numbers	Use Numicon to add single digits.  	 Use 10s frames to draw number bonds.	How many different ways can you make a total of 8?  Calculate number bonds mentally. Emphasis on different models and finding all the ways.

Year 2 addition

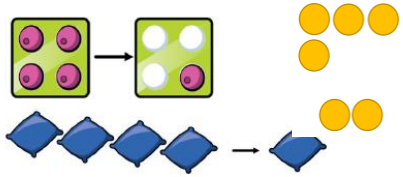
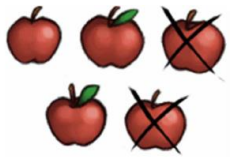
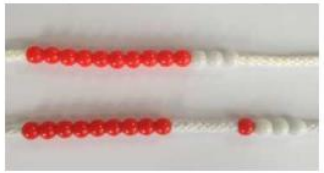
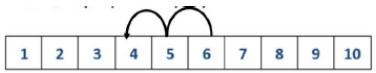
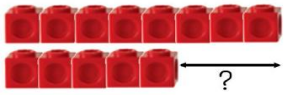
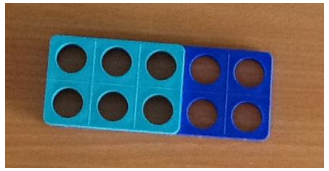
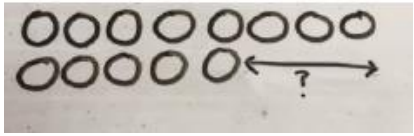
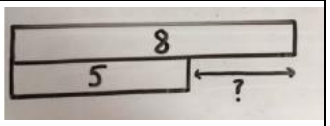
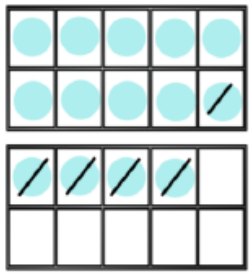
Objective	Concrete	Pictorial	Abstract
Recall number bonds to 20 and use these to derive facts to 100.	 Use Numicon to support learning of number bonds to 20.	 16 + 4 = 20 4 + 16 =20 20 - 4 =16 20 – 16 = 4 Use 10s frames. Find all 4 number sentences to match the image.	Calculate number bonds mentally. Children to develop an understanding of equality e.g 7 +13 = 20 7 + 13 = 13 + __ 9 + 11 = 8 + __
Add a two digit number and ones	  Use 10s frames/dienes. Children to explore patterns. E.g. 27 + 5 = 32, 37 + 5 = 42	 After practically using dienes to add, children can represent them with lines and dots.	 1 + 8 = 9 40 + 9 = 49  Record In different ways, moving towards a formal column method.
Add a two digit number and 10s.	  25 + 10 = 35 Explore how the ones digit does not change when adding 10 using dienes and Numicon.	  Use hundred sqaures and number lines to add 10s.	27 + 10 = 37 27 + 20 = 47 27 + □ = 57 Calculate mentally, moving on to missing number problems.
Add two 2 digit numbers.	 Continue to develop understanding of partitioning and place value by using dienes.	 Represent dienes on a place value chart.	 30 + 20 = 50 5 + 5 = 10 50 + 10 + 1 = 61 Formal method: 36 +25 61 1 Partition and add and then move on to formal column method.
Add 3 single digit numbers.	  Make 10 with 2 digits first if possible, then bridge through 10 to add the third number.		 Combine the two numbers to make 10 (if possible) and the bridge through 10.

Year 3 addition			
Objective	**Concrete**	**Pictorial**	**Abstract**
Add 2 three-digit numbers. HTO + HTO (no regrouping).	Use dienes/place value counters to represent the two numbers and count up the total hundreds, tens and ones. e.g. 224 + 132 	Children represent dienes pictorially and count up the totals. e.g. 324 + 232 	6 3 8 + 2 6 1 8 9 9
Add 2 three digit numbers. HTO + HTO (with regrouping).	 When there are 10 ones in the 1s column- we exchange for 1 ten, when there are 10 tens in the 10s column- we exchange for 1 hundred.	 Children represent place value counters pictorially, circling when they make an exchange.	243 +368 611 1 1
Year 4 addition			
Add four digits numbers. ThHTO + ThHTO (with regrouping)	Continue with dienes and place value counters as taught in Year 3 with four digit numbers.	 Draw pictorial reprersnetations on a place value grid.	6 7 3 8 + 1 2 9 1 8 0 2 9 1 1

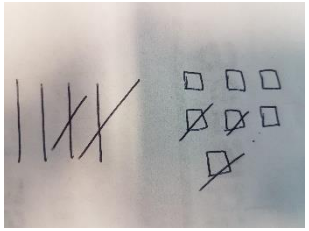
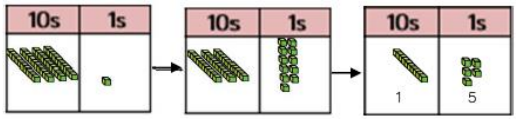
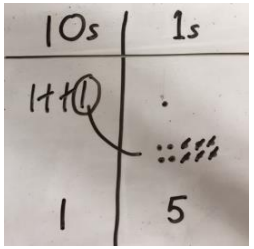
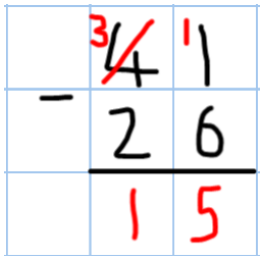
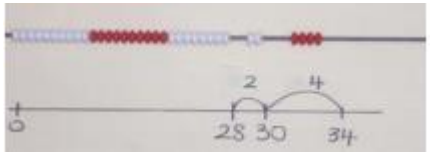
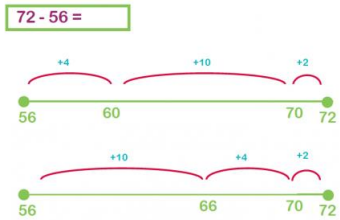
Year 5/ 6 addition

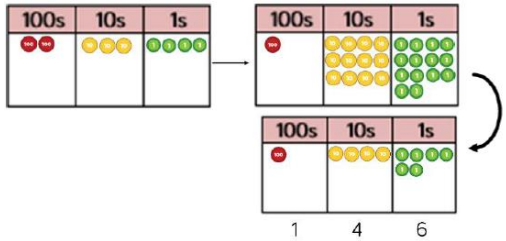
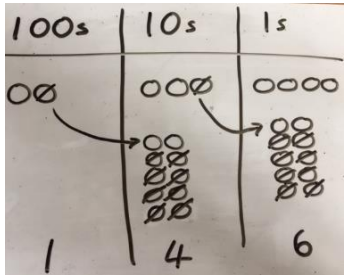
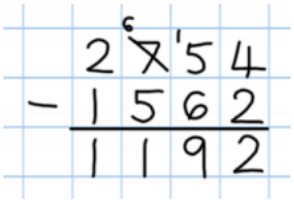
Add numbers with more than four digits using the formal written column method	When children begin to add numbers with 5 digits, they should be confident with the abstract. See Year 3 and 4 examples using dienes and place value counters if children need further support.	Pupils use formal column method to add 5 digit numbers.  They apply their knowledge so they can add more than 2 numbers at once. 
Add numbers with 2 decimal places, including money.		Pupils apply their knowledge to decimal numbers.  

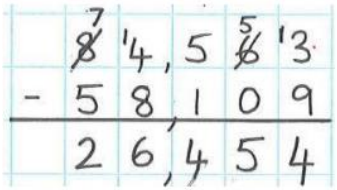
Year 1 subtraction

Objective	Concrete	Pictorial	Abstract
Take away ones	Use real-life physical objects, counters, cubes etc. to show how objects can be taken away.  6 – 2 = 4	Cross out drawn objects to show what has been taken away.  5 – 2 = 3	Use written calculations, moving on to changing where the equals symbol is in a calculation. 18 - 3= 15 8 – 2 = 6 4 = 6 – 2
Counting back	Use bead strings to create a number. Move the beads along whilst counting back in ones. 	On a number line count back in ones.  	Put the number 8 in your head and count back 4. Which number are you at? 8 – 4 = 4
Finding the difference	Make numbers using cubes or counters and compare lengths. Using Numicon, place the smaller number on top of the larger number.  	Draw counters and compare the two numbers visually. 	Use the bar model to compare two numbers.  8 – 5, the difference is ☐ Children to explore why 9 - 6 = 8 – 5 = 7 – 4 have the same difference.
Making ten	Make 14. Take away 4 to make 10. Take away 1.   	Children to present the ten frame pictorially and discuss what they did to make 10. 	Children to show how they can make 10 by partitioning the subtrahend. 14 - 5 = 9 4 1 14 – 4 = 10 10 – 1 = 9

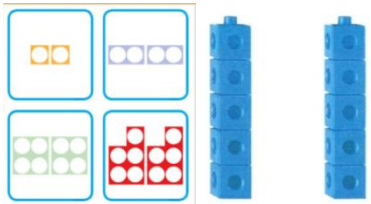
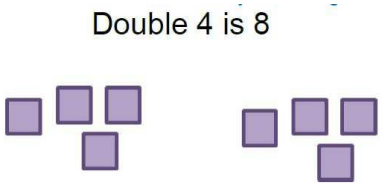
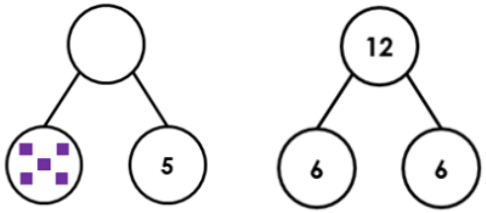
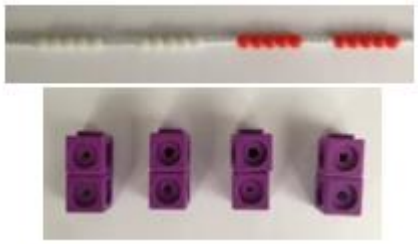
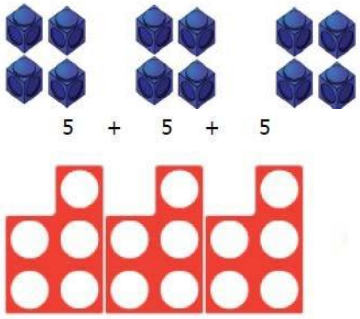
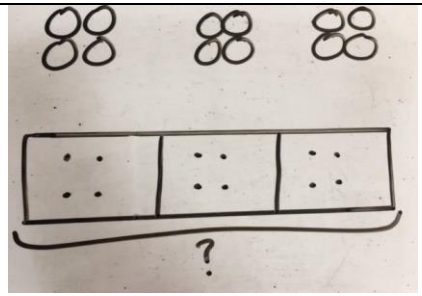
Year 2 subtraction

Objective	Concrete	Pictorial	Abstract
Subtracting tens and ones. No regrouping.	Make the larger number with dienes and take away the smaller one. Progress on to place value counters.  	Represent dienes using pictures. Draw the number and cross out the tens and ones. 	Children to begin using formal column method to record their subtraction. T O 47 -23 24
Column subtraction with regrouping.	Column subtraction using dienes. Exchange a ten for ones when needed. Example: 41 - 26 	Represent the base 10 pictorially, remembering to show the exchange. 	Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11. 
Making ten strategy *Progression should be crossing one ten, crossing more than one ten, crossing the hundreds.*	Use a bead bar or bead strings to model counting to next ten and the rest. 34 – 28 	**N/A**	Drawing number lines and counting forward, using knowledge of number bonds. 

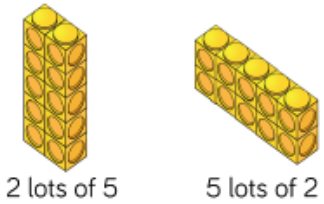
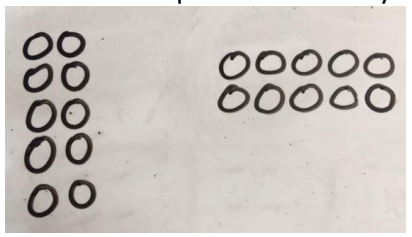
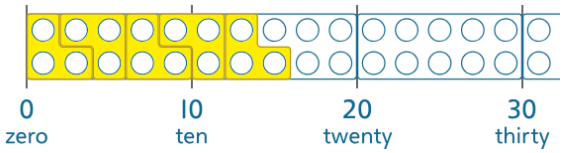
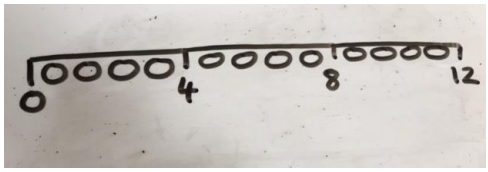
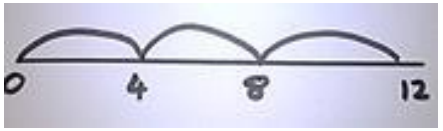
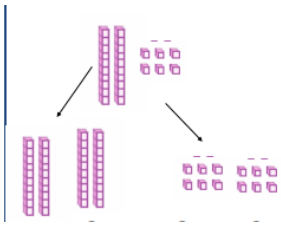
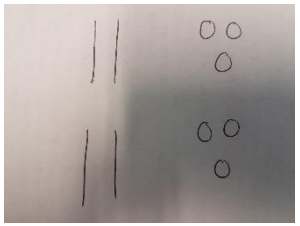
Year 3 subtraction			
Objective	**Concrete**	**Pictorial**	**Abstract**
Column subtraction of 3 digit numbers. HTO - HTO	Pupils use dienes and place value counters to regroup. Example: 234 – 88 	Represent the place value counters pictorially; remembering to show what has been exchanged. 	Formal column method. Children must understand what has happened when they have crossed out digits. $\begin{array}{r} 2\,\overset{2}{\cancel{3}}\,\overset{1}{4} \\ -\ 88 \\ \hline 6 \end{array}$
Year 4 subtraction			
Column subtraction of 4 digit numbers. ThHTO - ThHTO	Pupils use dienes and place value counters to regroup. See year 3 example.	Pupils represent dienes and place value counters to regroup. See year 3 example.	Formal column method. Children must understand what has happened when they have crossed out digits. 

Year 5/ 6 subtraction			
Column subtraction with more than 4 digits.	Pupils use dienes and place value counters to regroup. See year 3 example.	Pupils represent dienes and place value counters to regroup. See year 3 example.	Subtract whole numbers with more than 4 digits, including using formal written methods. 

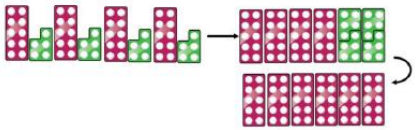
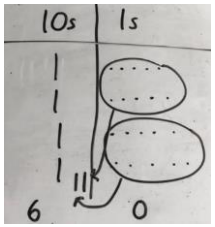
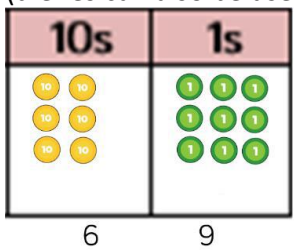
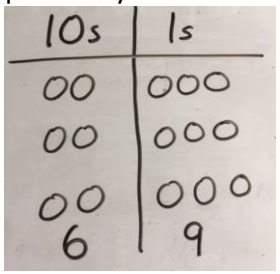
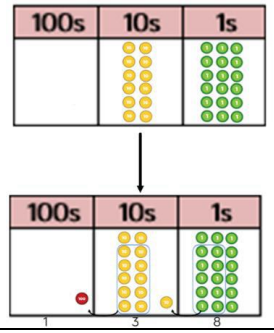
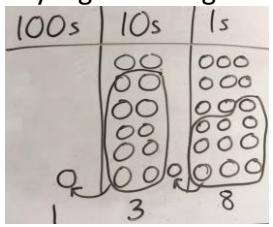
Year 1 multiplication

Objective	Concrete	Pictorial	Abstract
Doubling numbers	Use Practical activities using manipulatives including cubes and Numicon to demonstrate doubling. 	Draw pictures to show how to double a number. 	 Work out doubles mentally. Record in different ways including the part, part, whole model.
Counting in multiples	Count in multiples supported by concrete objects in equal groups. 	Children draw representations to show counting in multiples. 	Count in multiples of a number aloud.
Repeated addition	 4 + 4 + 4 = 12 Use different objects to add equal groups.	 Children represent with pictures, moving on to a bar model.	3 × 4 = 12 4 + 4 + 4 = 12

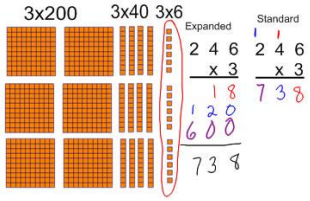
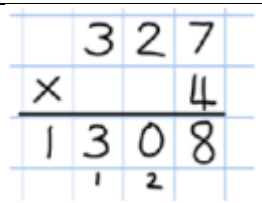
Year 2 multiplication

Objective	Concrete	Pictorial	Abstract
Understand that multiplication is commutative (can be done in any order).	Use arrays to illustrate commutativity counters and other objects can also be used. 2 × 5 = 5 × 2 	Children to represent the arrays pictorially. 	Children to be able to use an array to write a range of calculations e.g. 10 = 2 × 5 5 × 2 = 10 2 + 2 + 2 + 2 + 2 = 10 10 = 5 + 5
Use a number line to show repeated addition.	Number lines to show repeated groups e.g. 5 x 3 	Represent this pictorially alongside a number line e.g.: 	Abstract number line showing three jumps of four. 3 × 4 = 12 
Doubling of two digit numbers.	Use dienes and Numicon to show how to partition and regroup when doubling. 	Draw pictures and representations to show how to double numbers. e.g. 23 x 2 = 46 	Begin by double mentally by partitioning: 23 x 2 20 x 2= 40 3 x 2 = 6 40 + 6 = 46

Year 3 multiplication

Objective	Concrete	Pictorial	Abstract
Multiply two-digit numbers by one-digit numbers (using mental methods)	Partition to multiply using Numicon, dienes or Cuisenaire rods. 4 × 15 	Children to represent the concrete manipulatives pictorially. 	Children to be encouraged to show the steps they have taken. 4 x 15 10 5 10 x 4 = 40 5 x 4 = 20 40 + 20 = 60
Multiply two-digit numbers by one-digit numbers (using formal written method with no regrouping)	Formal column method with place value counters (dienes can also be used.) 3 × 23 	Children to represent the counters pictorially. 	23 × 3 69
Multiply two-digit numbers by one-digit numbers (using formal written method with no regrouping)	Formal column method with place value counters. 6 x 23 	Children to represent the counters/base 10, pictorially e.g. the image below. 	6 x 23 = 23 × 6 138 1 1

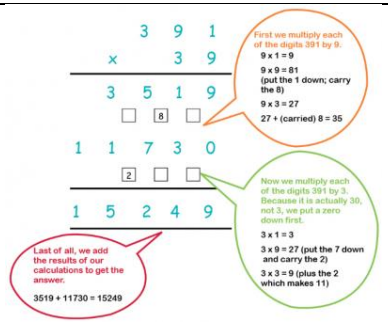
Year 4 multiplication

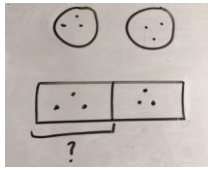
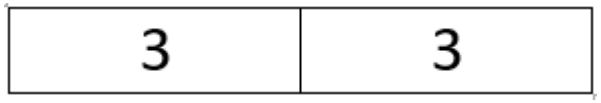
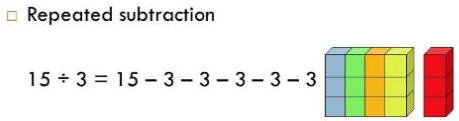
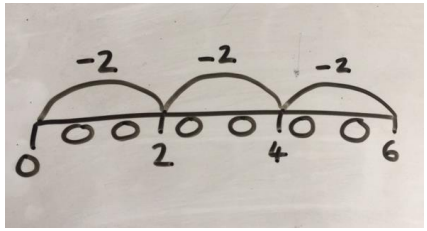
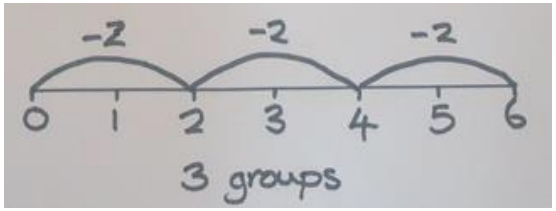
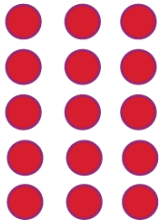
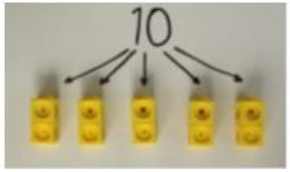
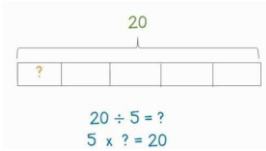
Objective	Concrete	Pictorial	Abstract
Multiply two-digit and three-digit numbers by a one-digit	Use dienes or place value counters to show multiplication and regrouping alongside the formal method. 	Children to represent the counters/base 10, pictorially e.g. the image below. See Year 3 example.	

Year 5 multiplication

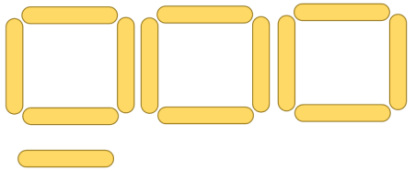
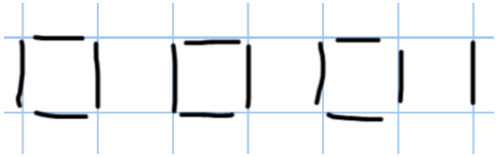
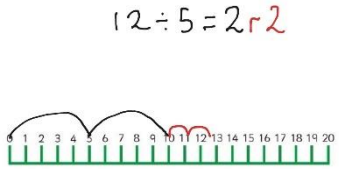
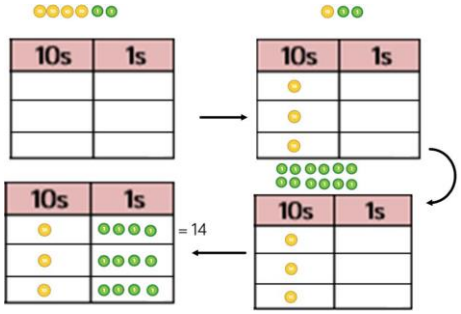
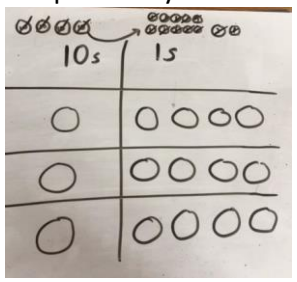
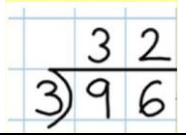
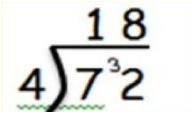
Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method	When children start to multiply 3 digits × 3 digits and 4 digits × 2 digits etc., they should be confident with the abstract:	124 × 26 744 2 480 3224 1 1 Answer: 3224

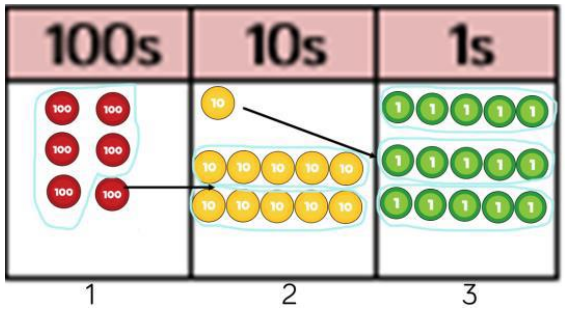
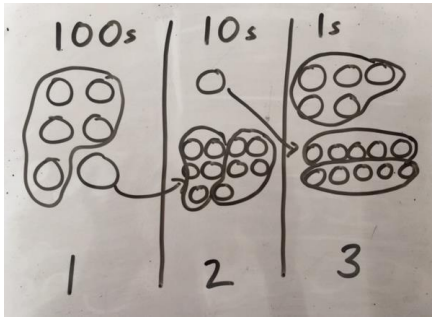
Year 6 multiplication

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method	When children start to multiply 3 digits × 3 digits and 4 digits × 2 digits etc., they should be confident with the abstract:	

Year 1 division			
Objective	**Concrete**	**Pictorial**	**Abstract**
Division as sharing	Sharing using a range of objects e.g. 	Represent the sharing pictorially. 	6 ÷ 2 = 3 
Year 2 division			
Repeated subtraction	Make the number with cubes and repeatedly subtract the same amount. 	Children to represent repeated subtraction pictorially. 	Abstract number line to represent the equal groups that have been subtracted. 
Using arrays	Division with arrays Link division to multiplication by creating an array and thinking about the number sentences that can be created.  e.g 3 x 4 = 12 12 ÷ 4 = 3 4 x 3 =12 12 ÷ 3 = 4	Children draw their own arrays. 	Find the inverse of multiplication and division sentences by creating four linking number sentences.
Division as grouping	Divide quantities into groups. Use cubes, counters, objects or value counters to aid understanding.  equal place	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. 	Divide 15 into 5 groups. How many are in each group?

Year 3 division

Divide 2 digit by 1 digits numbers with remainders	Use of lolly sticks to form whole groups with remainders left. e.g. 13 ÷ 4 = 3 r 1 	Children represent pictorially. 	Children are encouraged to use times tables and use repeated addition on a number line. 
Divide 2 digit numbers by 1 digit numbers (beyond times table knowledge)	Sharing using place value counters. e.g. 42 ÷ 3 = 14 	Children to represent the place value counters pictorially. 	Children to be able to make sense of the place value counters and write calculations to show the process. 42 ÷ 3 42 = 30 + 12 30 ÷ 3 = 10 12 ÷ 3 = 4 10 + 4 = 14 Move on to short division with no remainders.  

Year 4 division			
Divide 3 digit by 1 digits numbers using short division	Using place value counters to group. 615 ÷ 5  1. Make 615 with place value counters. 2. How many groups of 5 hundreds can you make with 6 hundred counters? 3. Exchange 1 hundred for 10 tens. 4. How many groups of 5 tens can you make with 11 ten counters? 5. Exchange 1 ten for 10 ones. 6. How many groups of 5 ones can you make with 15 ones?	Represent the place value counters pictorially.  	$\begin{array}{r} 123 \\ 5\overline{)\,6^{1}1^{1}5} \end{array}$
Year 5 division			
Divide 4 digit by 1 digits numbers using short division	Pupils use place value counters to divide. See Year 4 example.	Pupils represent place value counters pictorially. See Year 4 example.	Divide 4 digit numbers using short method. Pupils should move on to expressing remainders as decimals. $\begin{array}{r} 2\,0\,7\,3\,.\,2\,5 \\ 4\overline{)\,8\,2\,9\,3\,.\,{}_{10}\,{}_{20} } \end{array}$

Year 6 division

Objective	Concrete	Pictorial	Abstract
Divide numbers up to 4 digits by 2 digits using the formal written method.	When children start to divide by 2 digit numbers they should be confident with the abstract.		Children apply short method to larger numbers. 0 0 4 5 23 / 1 $^{1}0$ $^{10}3$ $^{11}5$ Children may move on to the long division method if they are ready to do so. e.g. 2544 ÷ 12 We can't group 2 thousands into groups of 12 so will exchange them. We can group 24 hundreds into groups of 12 which leaves with 1 hundred. 0 2 12 | 2544 24 1 After exchanging the hundred, we have 14 tens. We can group 12 tens into a group of 12, which leaves 2 tens. 0 2 1 12 | 2544 24 14 12 2 After exchanging the 2 tens, we have 24 ones. We can group 24 ones into 2 group of 12, which leaves no remainder. 0 2 1 2 12 | 2544 24 14 12 24 24 0