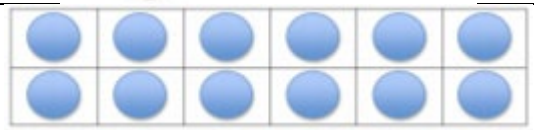
Woodland Academy Trust

Year 1 Calculation Document

Updated September 2021

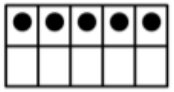
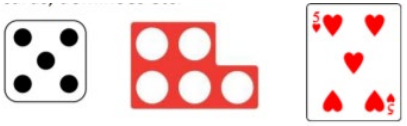
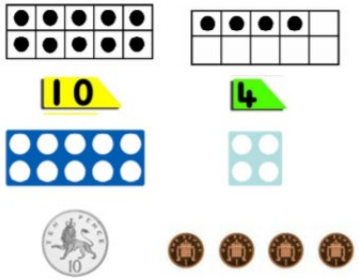
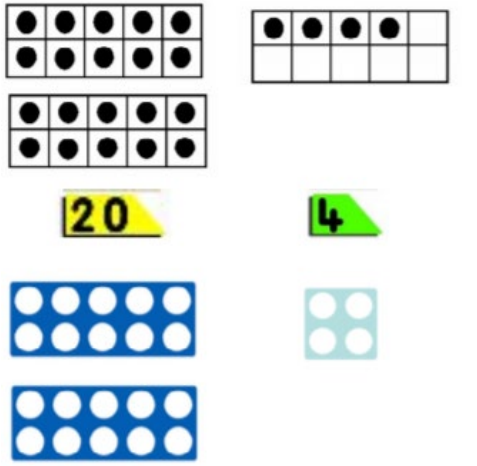
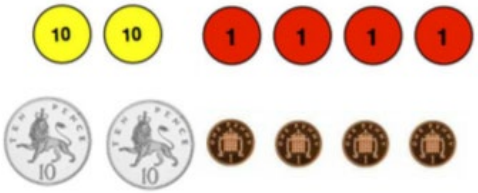
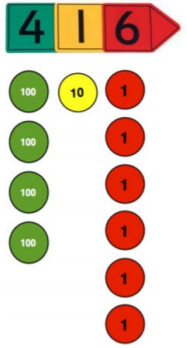
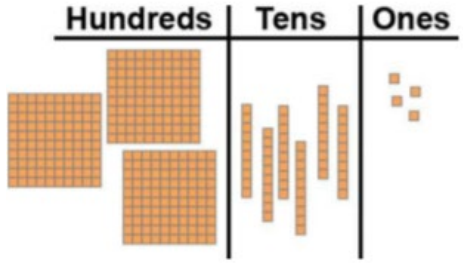
Progression in the use of manipulatives to support learning (How we support children's concrete understanding of maths)						
Foundation	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Real-life objects	Real-life objects	Mini-whiteboards	Mini-whiteboards	Mini-whiteboards	Mini-whiteboards	Mini-whiteboards
0 – 9 digit cards	0 – 9 digit cards	Place value cards			Protractors	Protractors
Number track/line to 20	Number line to 20 and 50	Number line to 100	Number line to 100	Number line including negative numbers	Number line including negative numbers	Number line including negative numbers
Meter/Counting stick	Meter/Counting stick	Meter/Counting stick	Meter/Counting stick	Meter/Counting stick	Meter/Counting stick	Meter/Counting stick
		Transparent rulers	Transparent rulers	Transparent rulers	Transparent rulers	Transparent rulers
Tens frame	Tens frame and hundred square	Tens frame and hundred square	Tens frame and hundred square	Tens frame and hundred square	Tens frame and hundred square	Tens frame and hundred square
Building blocks	Place value charts – Tens and ones	Place value charts – Ones to hundreds	Place value charts – Ones to Thousands	Place value charts – Ones to Ten thousands	Place value charts to a million and three decimal places	Place value charts to 10 million and three decimal places
Containers that are different shapes and sizes	Containers that are different shapes and sizes	Fraction bars, walls, circles (centralised storage)				
Numicon shapes	Numicon shapes/ Dienes	Dienes	Dienes	Dienes	Dienes	Dienes
Sorting hoops	Sorting hoops	Sorting hoops	Place value counters	Place value counters	Place value counters	Place value counters
Big Dice	Place value arrow cards – tens and ones	Place value arrow cards – tens and ones	Place value arrow cards – H, T, O	Place value arrow cards – H, T, O	Place value arrow cards	Place value arrow cards
Part-part-whole mat	Part-part-whole mat	Part-part-whole mat	Part-part-whole model	Part-part-whole model	Part-part-whole model	Part-part-whole model
Transparent counters	Transparent counters	Transparent counters	Transparent counters	Transparent counters	Transparent counters	Transparent counters
Bar model with real-life objects	Bar model pictorial objects/ representative objects e.g. counters	Bar model with counters /Dienes progressing to numbers	Plastic mirrors	Plastic mirrors	Plastic mirrors	Plastic mirrors
Bead strings – ten	Bead strings – twenty/fifty	Bead strings - hundred	Bead strings - hundred	Bead strings - hundred	Bead strings - hundred	Bead strings - hundred
Dice	Dice	Dice	Dice	Dice	Dice	Dice
Cuisenaire rods	Cuisenaire rods	Cuisenaire rods	Cuisenaire rods	Cuisenaire rods	Cuisenaire rods	Cuisenaire rods
Double sided counters	Double sided counters	Double sided counters	Double sided counters	Double sided counters	Double sided counters	Double sided counters
Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount	Multilink – use one colour to model an amount
Maths balances			Weighing scales			
Solid geometric shapes (centralised storage)						
Coins and notes (centralised storage)						
Clock (geared) (centralised storage)						

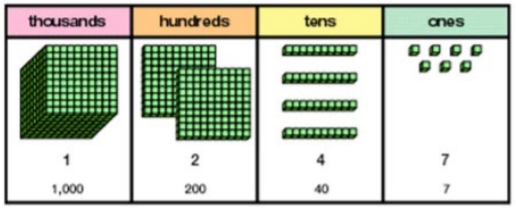
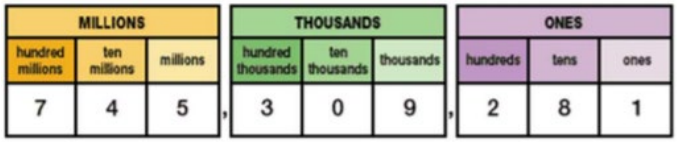
Maths Working Wall (How we use displays to support children's understanding of mathematical concepts)		
Build it	Use a real-life representation of the concept, which children can see, touch and feel.	
Draw it	Show a pictorial representation of the concept.	
Solve it	Show the mathematical representation of the concept	6 x 2 = 12 2 x 6 = 12 12 ÷ 2 = 6 12 ÷ 6 = 2 Factors of 12 are: 1, 2, 3, 4, 6 and 12
Practise it	Encourage children to practice the concept. Interactive opportunity – ask children to respond to questions, encourage them to add what they know, leave homework for children to take to master the concept.	1 x 2 = 2 2 x 2 = 4 3 x 2 = 6 etc.
Challenge it	Set a challenge to be solved. Interactive opportunity – leave real-life objects or manipulatives for children to use to help solve the challenge.	How many different ways can 12 eggs be arranged into arrays? What if you try 24 eggs?
Say it	Use vocabulary related to the concept	Multiply, multiplication , repeated addition, array, divide, group, multiples, factors

Classroom visual prompts (How we represent maths to the children pictorially)						
Foundation	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Big focus 10	Big focus 20	Big focus 100				
Place Value Chart 10	Place Value Chart 20	Place Value Chart 100	Place Value Chart Th- tenths	Place Value Chart Tth- Hundredths	Place Value Chart M- Thousandths	Place Value Chart M- Thousandths
Numicon number line with Numicon shapes	Numicon number line with Numicon shapes	Fractions number line	Fractions number line	Fractions and decimals number line	Fractions, decimals and percentages number line	Fractions, decimals and percentages number line
Odd and even numbers	Odd and even numbers	Odd and even numbers	Factors and multiples	Factors and multiples	Factors, prime and composite numbers	Number properties
	Number bonds to 10 Number bonds to 20	Number bonds to 10 Multiples of 10 totalling 100	Number bonds to 10 Multiples of 10 totalling 100			
0 – 20 number line / track	0 -50 number line	0 – 100 number line	Number line to 100	Number line including negative numbers	Number line including negative numbers	Number line including negative numbers
	100 square	100 square	100 square	100 square	100 square	100 square
Number names from 0 - 10	Number names of multiples of 10	Number names from 0 – 100	Number names from 0 - 1000	Number names to hundred thousands	Number names to one million	Number names to million
Real coins and Large coins	Real coins and Large coins	Real coins and Large coins	Real coins and Large coins	Real coins and Large coins	Real coins and Large coins	Real coins and Large coins
Counting in 1s and 2s	2, 5 and 10 multiplication tables	2, 4 and 8 multiplication tables	3, 6 and 12 multiplication tables	7, 9 and 11 multiplication tables All multiplication tables up to 12 x 12	All multiplication tables up to 12 x 12	All multiplication tables up to 12 x 12
Counting in 1s and 2s multiplication table patterns and divisibility rules and connections.	2, 5 and 10 multiplication table patterns and divisibility rules and connections. Display after introducing the times tables to the children.	2, 4 and 8 multiplication table patterns and divisibility rules and connections. Display after introducing the times tables to the children.	3, 6 and 12 multiplication table patterns and divisibility rules and connections. Display after introducing the times tables to the children.	All multiplication table patterns and divisibility rules Connections between 5/10, 3/6/12, 2/4/8 Also focus on 1, 7, 9 and 0 multiplication table.	All multiplication table patterns and divisibility rules Connections between 5/10, 3/6/12, 2/4/8 Also focus on 1, 7, 9 and 0 multiplication table. Square and cube numbers	All multiplication table patterns and divisibility rules Connections between 5/10, 3/6/12, 2/4/8 Also focus on 1, 7, 9 and 0 multiplication table. Square and cube numbers
			Roman numerals	Roman numerals	Roman numerals	Roman numerals
The = sign means not an answer but is equivalent to	The = sign means not an answer but is equivalent to	The = sign means not an answer but is equivalent to	The = sign means not an answer but is equivalent to	The = sign means not an answer but is equivalent to	The = sign means not an answer but is equivalent to	The = sign means not an answer but is equivalent to
2D and 3D shapes	2D and 3D shapes	2D and 3D shapes	2D and 3D shapes	2D and 3D shapes	2D and 3D shapes	2D and 3D shapes

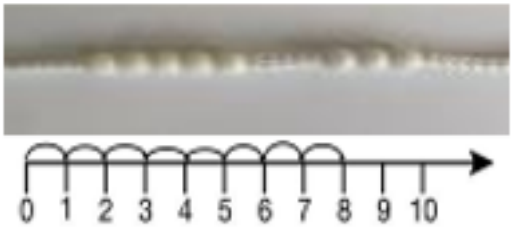
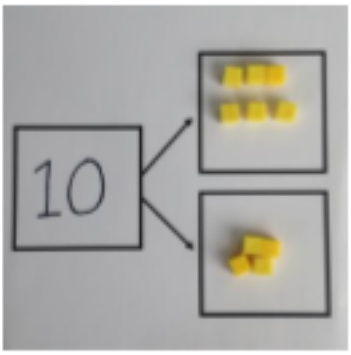
	EYFS/Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	Combining two parts to make a whole: part whole model. Starting at the bigger number and counting on- using cubes. Regrouping to make 10 using ten frame.	Adding three single digits. Use of base 10 to combine two numbers.	Column method- regrouping. Using place value counters (up to 3 digits).	Column method- regrouping. (up to 4 digits)	Column method- regrouping. Use of place value counters for adding decimals.	Column method- regrouping. Abstract methods. Place value counters to be used for adding decimal numbers.
Subtraction	Taking away ones Counting back Find the difference Part whole model Make 10 using the ten frame	Counting back Find the difference Part whole model Make 10 Use of base 10	Column method with regrouping. (up to 3 digits using place value counters)	Column method with regrouping. (up to 4 digits)	Column method with regrouping. Abstract for whole numbers. Start with place value counters for decimals- with the same amount of decimal places.	Column method with regrouping. Abstract methods. Place value counters for decimals- with different amounts of decimal places.
Multiplication	Recognising and making equal groups. Doubling Counting in multiples Use cubes, Numicon and other objects in the classroom	Arrays- showing commutative multiplication	Arrays 2d × 1d using base 10	Column multiplication- introduced with place value counters. (2 and 3 digit multiplied by 1 digit)	Column multiplication Abstract only but might need a repeat of year 4 first(up to 4 digit numbers multiplied by 1 or 2 digits)	Column multiplication Abstract methods (multi-digit up to 4 digits by a 2 digit number)
Division	Sharing objects into groups Division as grouping e.g. I have 12 sweets and put them in groups of 3, how many groups? Use cubes and draw round 3 cubes at a time.	Division as grouping Division within arrays- linking to multiplication Repeated subtraction	Division with a remainder-using lollipop sticks, times tables facts and repeated subtraction. 2d divided by 1d using base 10 or place value counters	Division with a remainder Short division (up to 3 digits by 1 digit- concrete and pictorial)	Short division (up to 4 digits by a 1 digit number including remainders)	Short division Long division with place value counters (up to 4 digits by a 2 digit number) Children should exchange into the tenths and hundredths column too

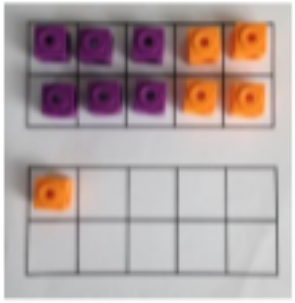
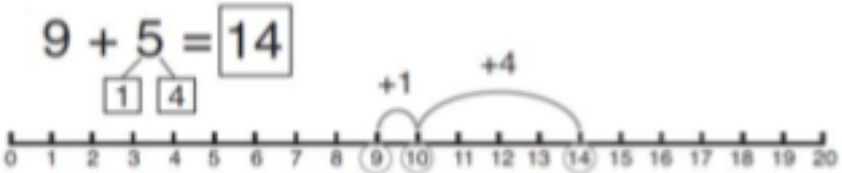
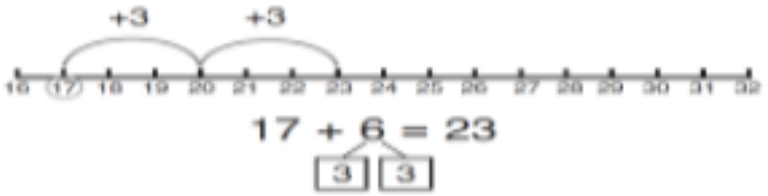
Progression in the teaching of place value

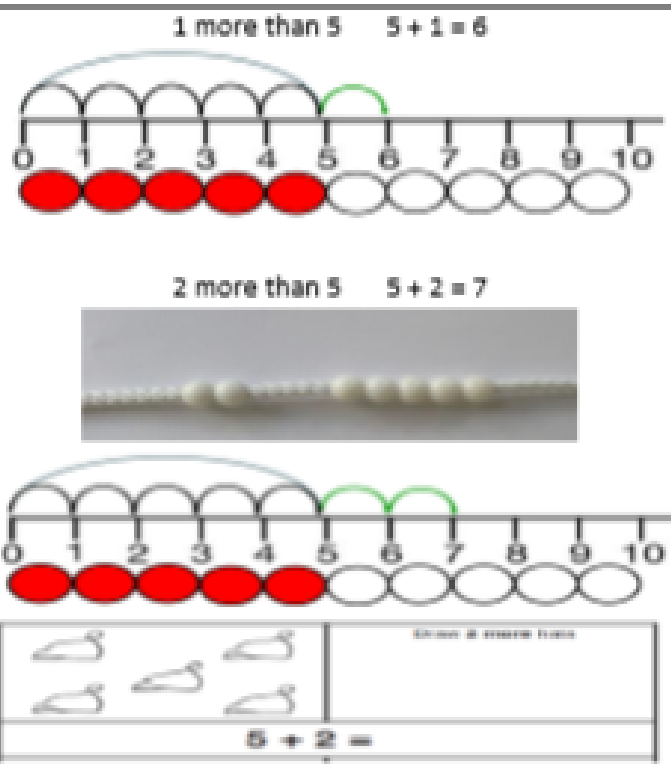
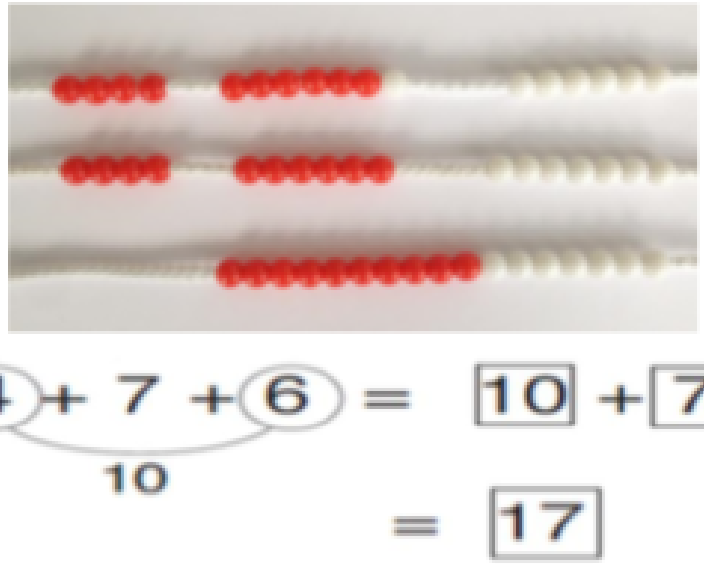
Foundation	Year 1	Year 2	Year 3 onwards
Understanding ten	Understanding numbers up to 20	Understanding numbers up to one hundred	Understanding numbers up to one thousand
A TENS FRAME is a simple maths tool that helps children: • Keep track of counting • See number relationships • Learn addition to 10 • Understand place value Use tens frames flash cards daily to ensure children recognise amounts. Use empty tens frames to fill with counters to enable children to understand number relationships. Either fill the tens frame in pairs or in rows. In rows shows 5 as a benchmark. Children can easily see more than 5 or less.  Setting the counters in pairs, naturally allows the children to see addition concepts. Include other visual images such as dice, cards, dominoes etc. 	'Ten' is the building block of our Base 10 numeration system. Young children can usually 'read' two-digit numbers long before they understand the effect the placement of each digit has on its numerical value. A child might be able to correctly read 62 as sixty two and 26 as twenty-six, and even know which number is larger, without understanding why the numbers are of differing values. Ten-frames can provide a first step into understanding two-digit numbers simply by the introduction of a second frame. Placing the second frame to the right of the first frame, and later introducing numeral cards, will further assist the development of place value understanding. 	Continue developing place value through the use of tens frames.  	Continue developing place value through the use of manipulatives including recognising 416 as 41 tens and 6 ones which is equivalent to 416 ones which is equivalent to four hundreds and one ten and six ones  Use Dienes blocks and place value charts 

Progression in the teaching of place value		
Year 4	**Year 5**	**Year 6**
Understanding numbers up to ten thousand	**Understanding numbers up to one million including decimals**	**Understanding numbers beyond one million including decimals**
Continue developing place value through the use of manipulatives. • Place value arrow cards • Place value counters • Dienes blocks • Place value charts  Continue developing place value through the use of manipulatives including recognising the number above as one thousand plus two hundred plus four tens plus seven ones is equivalent to twelve hundred plus 47 ones etc. The children must also be able to identify that this number is also 12,470 tenths	Continue developing place value through the use of manipulatives. • Place value arrow cards • Place value counters (including decimal counters) • Dienes blocks • Place value charts  They need to understand that there are no ten thousands in this number. The value of the digit 9 is nine thousand but there are three hundred and nine thousands in this number. They need to be able to recognise the value of the digit and the number and know that these are different. They also need to know how many tenths and hundredths are in this number 3092810 tenths and 30928100 hundredths in this number.	Continue developing place value through the use of manipulatives. • Place value arrow cards • Place value counters (including decimals counters) • Dienes blocks • Place value charts  They need to understand that there are no ten thousands in this number. The value of the digit 9 is nine thousand but there are 745309 thousands in this number. They need to be able to recognise the value of the digit and the number and know that these are different. They also need to know how many tenths, hundredths and thousandths there are in this number 7453092810 tenths and 74530928100 hundredths and 745309281000 thousandths in this number.

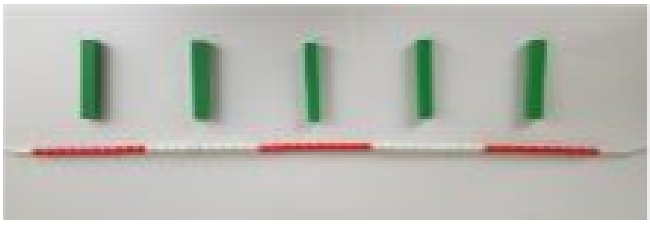
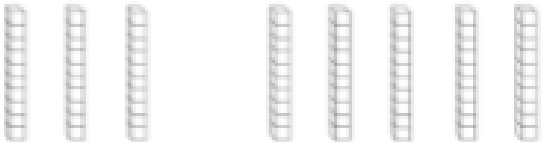
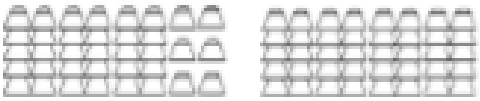
Y1 Addition

Strategy & guidance	CPA
Count all *Joining two groups and then recounting all objects using one-to-one correspondence*	3 + 4 = 7    0 1 2 3 4 5 6 7 8 9 10 5 + 3 = 8
Counting on *As a strategy, this should be limited to adding small quantities only (1, 2 or 3) with pupils understanding that counting on from the greater number is more efficient.*	8 + 1 = 9   8 + 1 = 9 15 = 12 + 3   8 9 10 11 12 13 14 15 16
Part-part-whole *Teach both addition and subtraction alongside each other, as pupils will use this model to identify the inverse relationship between them.* *This model begins to develop the understanding of the commutativity of addition, as pupils become aware that the parts will make the whole in any order.*	  10 = 6 + 4 10 − 6 = 4 10 − 4 = 6 10 = 4 + 6

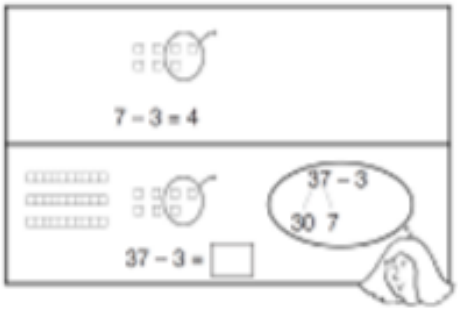
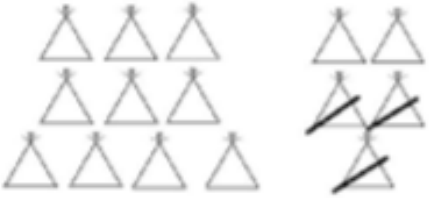
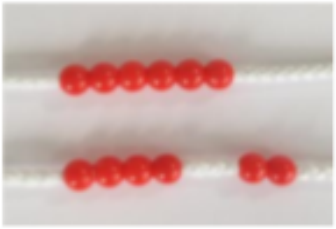
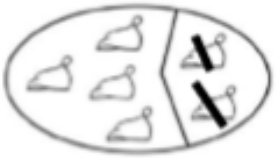
Regrouping ten ones to make ten *This is an essential skill that will support column addition later on.*	 3 + 9 =  3 + 9 = 12  
'Make ten' strategy *Pupils should be encouraged to start at the greater number and partition the smaller number to make ten.* *The colours of the beads on the bead string make it clear how many more need to be added to make ten.* *Also, the empty spaces on the ten frame make it clear how many more are needed to make ten.*	6 + 5 = 11  4 + 9 = 13   

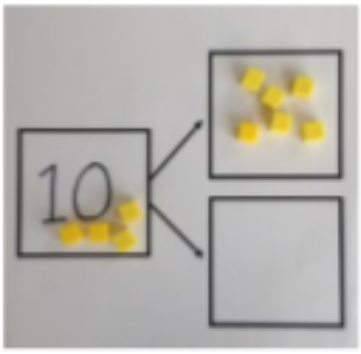
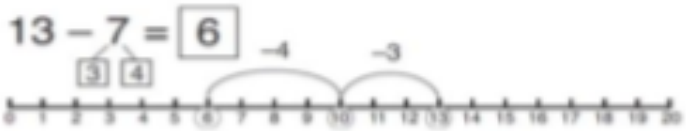
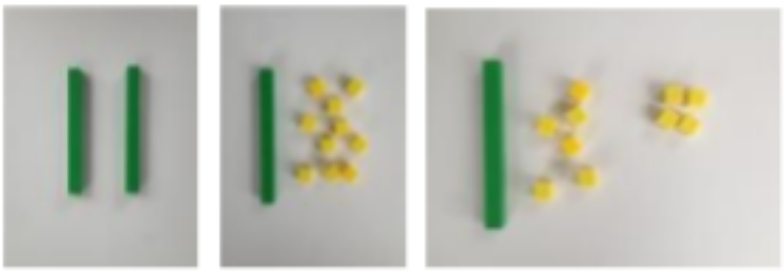
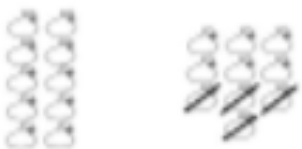
Adding 1, 2, 3 more *Here the emphasis should be on the language rather than the strategy. As pupils are using the beadstring, ensure that they are explaining using language such as;* *'1 more than 5 is equal to 6.'* *'2 more than 5 is equal to 7.'* *'8 is 3 more than 5.'* ***Over time, pupils should be encouraged to rely more on their number bonds knowledge than on counting strategies.***	
Adding three single digit numbers (make ten first) *Pupils may need to try different combinations before they find the two numbers that make 10.* *The first bead string shows 4, 7 and 6. The colours of the bead string show that it makes more than ten.* *The second bead string shows 4, 6 and then 7.* *The final bead string shows how they have now been put together to find the total.*	

Partitioning to add (no regrouping) *Place value grids and Dienes blocks could be used as shown in the diagram before moving onto pictorial representations. Dienes blocks should always be available, as the main focus in Year 1 is the concept of place value rather than mastering the procedure.* *When not regrouping, partitioning is a mental strategy and does not need formal recording in columns. This representation prepares them for using column addition with formal recording.*	24 + 13 = 37 
Introducing column method for addition, regrouping only *Dienes blocks and place value grids should be used as shown in the diagrams. Even when working pictorially, pupils should have access to Dienes blocks.* *See additional guidance on unit pages for extra guidance on this strategy.*	24 + 17 

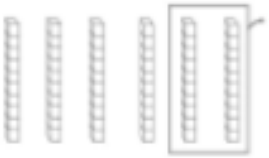
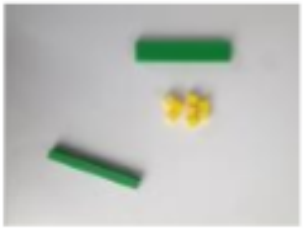
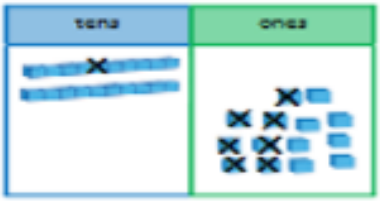
Adding multiples of ten *Using the vocabulary of 1 ten, 2 tens, 3 tens etc. **alongside** 10, 20, 30 is important, as pupils need to understand that it is a **ten** and not a one that is being added and they need to understand that a '2' digit in the tens column has a value of twenty.* *It also emphasises the link to known number facts. E.g. '2 + 3 is equal to 5. So 2 tens + 3 tens is equal to 5 tens.*	50 = 30 + 20   3 tens + 5 tens = _____ tens 30 + 50 = _____  36 + 40 = ☐

Y1 Subtraction

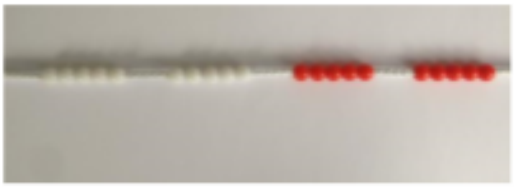
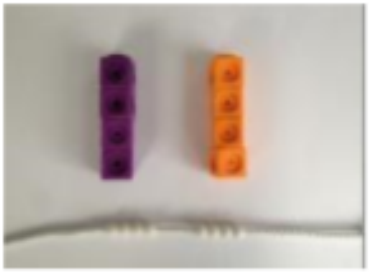
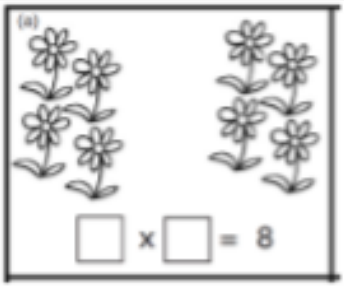
Strategy & guidance	CPA
Taking away from the ones *When this is first introduced, the concrete representation should be based upon the diagram. Real objects should be placed on top of the images as one-to-one correspondence so that pupils can take them away, progressing to representing the group of ten with a tens rod and ones with ones cubes.*	  15 – 3 = 12  6 – 2 = 4  28 - 4 =
Counting back *Subtracting 1, 2, or 3 by counting back* ***Pupils should be encouraged to rely on number bonds knowledge as time goes on, rather than using counting back as their main strategy.***	  4 = 6 – 2 16 – 2 = 14  

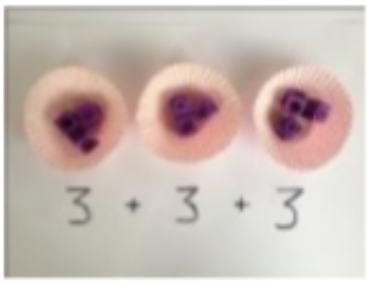
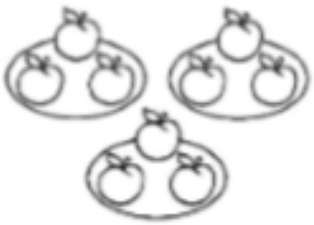
Part-part-whole *Teach both addition and subtraction alongside each other, as the pupils will use this model to identify the link between them.* *Pupils start with ten cubes placed on the whole.* *They then remove what is being taken away from the whole and place it on one of the parts.* *The remaining cubes are the other part and also the answer. These can be moved into the second part space.*	10 – 6 = 4   
Make ten strategy *To subtract a 1-digit number from a 2-digit number.* *Pupils identify how many need to be taken away to make ten first, partitioning the number being subtracted. Then they take away the rest to reach the answer.*	14 – 5 = 9  
Regroup a ten into 10 ones *After the initial introduction, the Dienes blocks should be placed on a place value chart to support place value understanding. This will support pupils when they later use the column method.*	  20 – 4 =

Taking away from the tens *Pupils should identify that they can also take away from the tens and get the same answer.* *This reinforces their knowledge of number bonds to 10 and develops their application of number bonds for mental strategies.*	9 = 15– 6   16 – 8 = 8
Partitioning to subtract without regrouping *Dienes blocks on a place value chart (developing into using images on the chart) could be used, as when adding 2-digit numbers, reinforcing the main concept of place value for Year 1.* *When not regrouping, partitioning is a mental strategy and does not need formal recording in columns. This representation prepares them for using column subtraction with formal recording.*	34 – 13 = 21  34 – 13 = 21

Subtracting multiples of ten *Using the vocabulary of 1 ten, 2 tens, 3 tens etc. alongside 10, 20, 30 is important as pupils need to understand that it is a* ***ten*** *not a one that is being taken away.*	40 = 60 – 20    6 tens – 2 tens = ____ tens 60 – 20 = ____ 38 – 10 = 28    38 – 10 = ☐
Column method with regrouping *This example shows how pupils should work practically when being introduced to this method.* *There is no formal recording in columns in Year 1 but this practical work will prepare pupils for formal methods in Year 2.* *See additional guidance on unit pages to support with this method.*	34 – 17 = 17    

Y1 Multiplication

Strategy & guidance	CPA
Skip counting in multiples of 2, 5, 10 from zero *The representation for the amount of groups supports pupils' understanding of the written equation. So two groups of 2 are 2, 4. Or five groups of 2 are 2, 4, 6, 8, 10.* *Count the groups as pupils are skip counting.* *Number lines can be used in the same way as the bead string.* *Pupils can use their fingers as they are skip counting.*	 4 × 5 = 20  2 × 4 = 8
Making equal groups and counting the total *How this would be represented as an equation will vary. This could be 2 × 4 or 4 × 2. The importance should be placed on the vocabulary used alongside the equation. So this picture could represent 2 groups of 4 or 4 twice.*	  Draw  to show 2 x 3 = 6

Solve multiplications using repeated addition *This strategy helps pupils make a clear link between multiplication and division as well as exemplifying the 'repeated addition' structure for multiplication. It is a natural progression from the previous 'count all' strategy as pupils can be encouraged to 'count on'. However, as number bonds knowledge grows, pupils should rely more on these important facts to calculate efficiently.*	3 x 3 = 3 + 3 + 3   How many apples are there altogether? 3 + 3 + 3 = 9

Y1 Division

Strategy & guidance	CPA
Sharing objects into groups *Pupils should become familiar with division equations through working practically.* *The division symbol is not formally taught at this stage.*	10 ÷ 2 = 5