PROGRESSION THROUGH CALCULATION GUIDANCE

This guidance has been developed from the White Rose Calculation Policy: working document, which was written as a guide to indicate the progression through Addition, Subtraction, Multiplication and Division in Years 1 – 2.

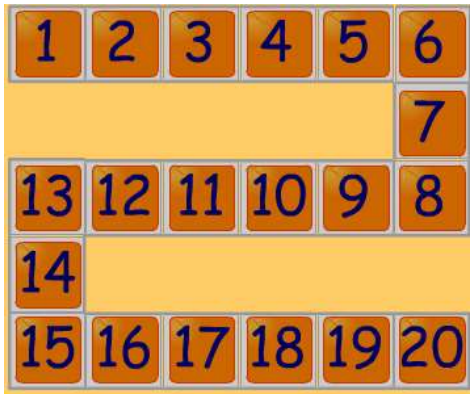
	Addition	Subtraction	Multiplication	Division
Reception	Count reliably with numbers from 1 to 20, place them in order. Say which number is one more than a given number. Using quantities and objects, they add two single-digit numbers and count on to find the answer.	Say which number is one less than a given number. Using quantities and objects, they subtract two single-digit numbers and count back to find the answer.	They solve problems, including doubling, halving and sharing.	They solve problems, including halving and sharing.
Year 1	Count to and across 100, forwards beginning with 0 or 1, or from any given number. Given a number, identify one more. Read, write and interpret mathematical statements involving addition (+), and equals (=) signs. Represent and use number bonds and related subtraction facts within 20 Add one-digit and two-digit numbers to 20, including zero. Solve one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems.	Say which number is one less than a given number. Represent and use number bonds and related subtraction facts within 20. Read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs. Subtract one-digit and two-digit numbers to 20, including zero. Solve one-step problems that involve subtraction using concrete objects and pictorial representations, and missing number problems.	Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
Year 2	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts to 100. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. Add numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones a two-digit number and tens two two-digit numbers Adding three one-digit numbers. Solve problems with addition including those involving numbers, quantities and measures.	Recall and use subtraction facts to 20 fluently, and derive and use related facts to 100. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. Subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones a two-digit number and tens two two-digit numbers Adding three one-digit numbers.	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers. Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs. Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	Recall and use division facts for 2, 5 and 10 multiplication tables. Calculate mathematical statements for multiplication and division within the multiplication tables and write then using the multiplication (x), division ( ) and equals (=) signs. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. Find 1/3; 1/4; 2/4; ¾ of a length, shape, set of objects or quantity

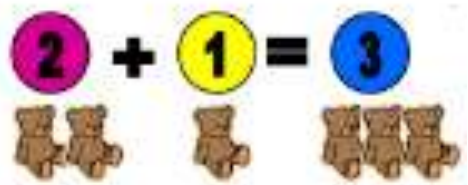
CALCULATION GUIDANCE: Addition
Reception

Recognise numbers up to 20 and understand the meaning of each number by recognising and knowing their clusters

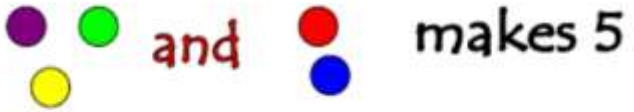
Count on in ones and say which number is one more than a given number using a number line or number track to 20.

Begin to relate addition to combining two groups of objects using practical resources, role play, stories and songs.



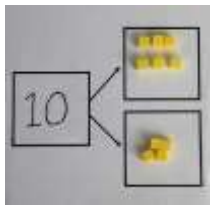
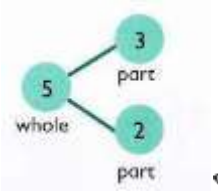
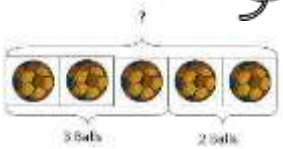
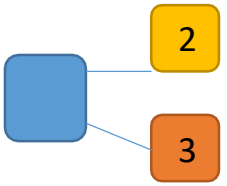
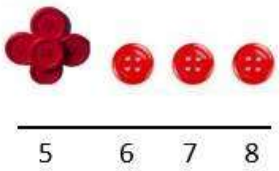


Know that counting on is a strategy for addition. Use numbered number lines to 20.

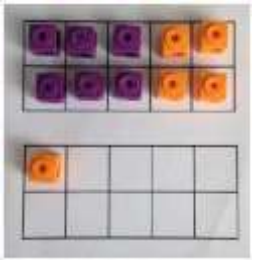
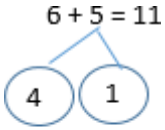
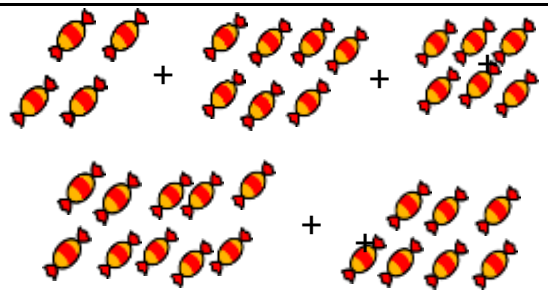
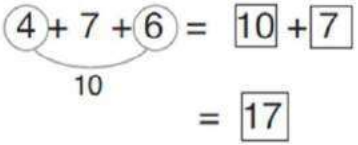


CALCULATION GUIDANCE: Addition

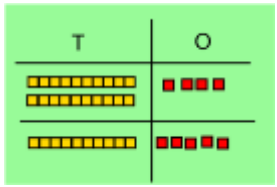
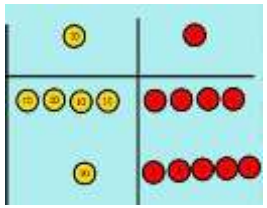
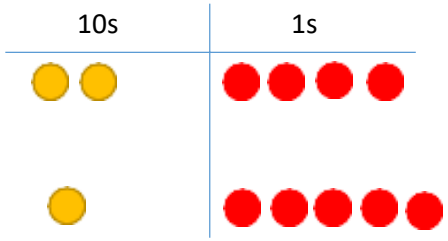
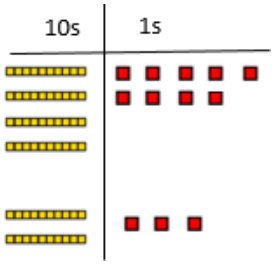
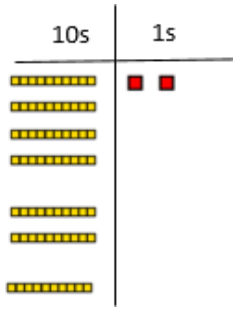
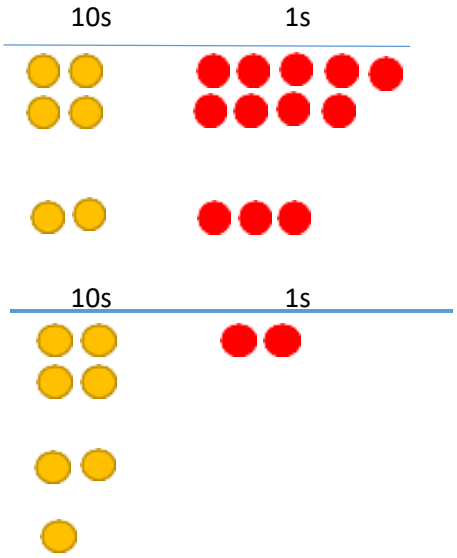
Key Language: sum, total, parts and wholes, plus, add, together, more, 'is equal to' and 'is the same as

	Objective	Concrete	Pictorial	Abstract
Year 1	Number bonds of 5, 6, 7, 8, 9 and 10	  Use cubes to add two numbers together as a group or in a bar. 	  Use pictures to add two numbers together as a group or in a bar. 	2 + 3 = 5 3 + 2 = 5 5 = 3 + 2 5 = 2 + 3  Use the part-part-whole diagram as shown above to move into the abstract.
	Counting	 Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer. 	Use a number line to count on in ones. 	5 + 3 = 8

CALCULATION GUIDANCE: Addition

	Objective	Concrete	Pictorial	Abstract
Year 1	Regrouping to make 10	  6 + 5 = 11 Start with the bigger number and use the smaller number to make 10.	 6 + 5 = 11  6 + 4 =10 10 + 1 = 11	6 + 5 = 11
Year 2	Adding 3 single digit numbers	4 + 7 + 6= 17 Put 4 and 6 together to make 10. Add on 7.  Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	 Add together three groups of objects. Draw a picture to recombine the groups to make 10.	 Combine the two numbers that make 10 and then add on the remainder.

CALCULATION GUIDANCE: Addition

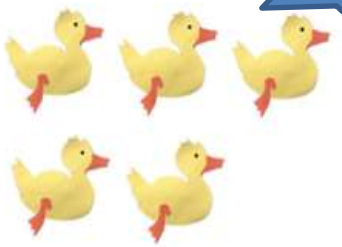
	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	Add together the ones first, then add the tens. Use the Base 10 blocks first before moving onto place value counters. 24 + 15 =  44 + 15 = 	After physically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.  	24 + 15 = 39 24 + 15 39
	Column method with regrouping	Make both numbers on a place value grid.  Add up the units and exchange 10 ones for 1 ten.  	Using place value counters, children can draw the counters to help them to solve additions.  	40 + 9 20 + 3 60 + 12 = 72

CALCULATION GUIDANCE: Subtraction

Say which number is one less than a given number using a number line or number track to 20.

Begin to count backwards in familiar contexts such as number rhymes or stories.

10 Green Bottles sitting on the wall ...



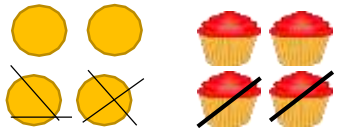
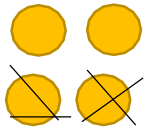
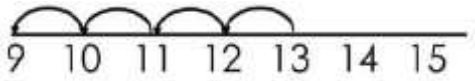
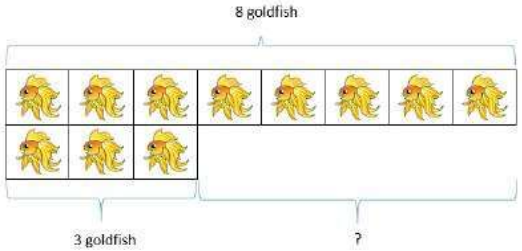
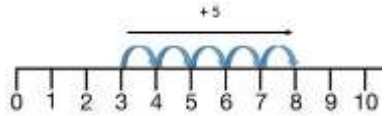
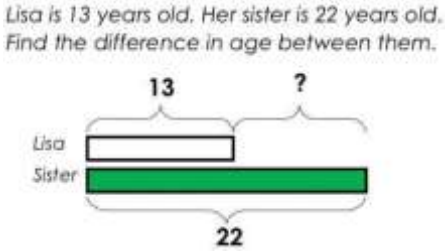
Begin to relate subtraction to 'taking away' using concrete objects and role play.

Three teddies take away two teddies leaves one teddy

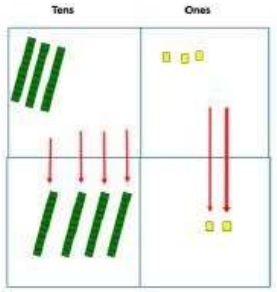
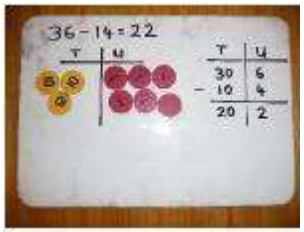
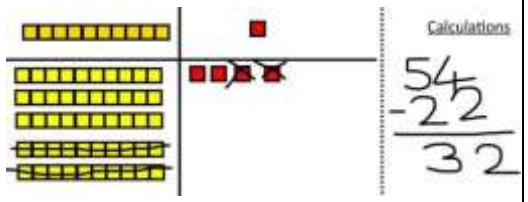
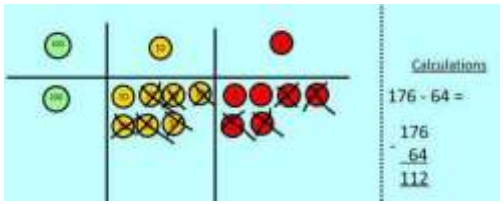
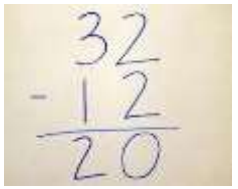
Count backwards along a number line to 'take away'

CALCULATION GUIDANCE: Subtraction

Key language: take away, less than, the difference, subtract, minus, fewer, decrease

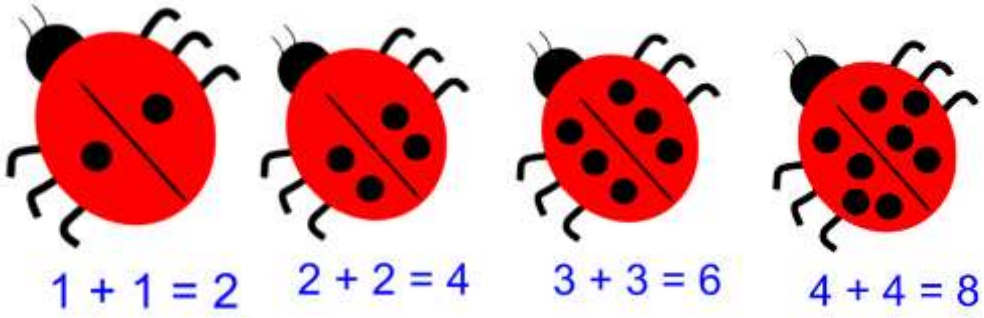
	Objective	Concrete	Pictorial	Abstract
Year 1	Taking away ones	Use physical objects, counters, cubes etc. to show how objects can be taken away. 4 – 2 = 2 	Cross out drawn objects to show what has been taken away. 4 – 2 = 2 	4 – 2 = 2
	Counting back	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones.  13 – 4 = 9	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.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.
	Find the difference	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.	 Count on to find the difference.  Draw bars to find the difference between 2 numbers.	Hannah has 8 goldfish. Helen has 3 goldfish. Find the difference between the number of goldfish the girls have.

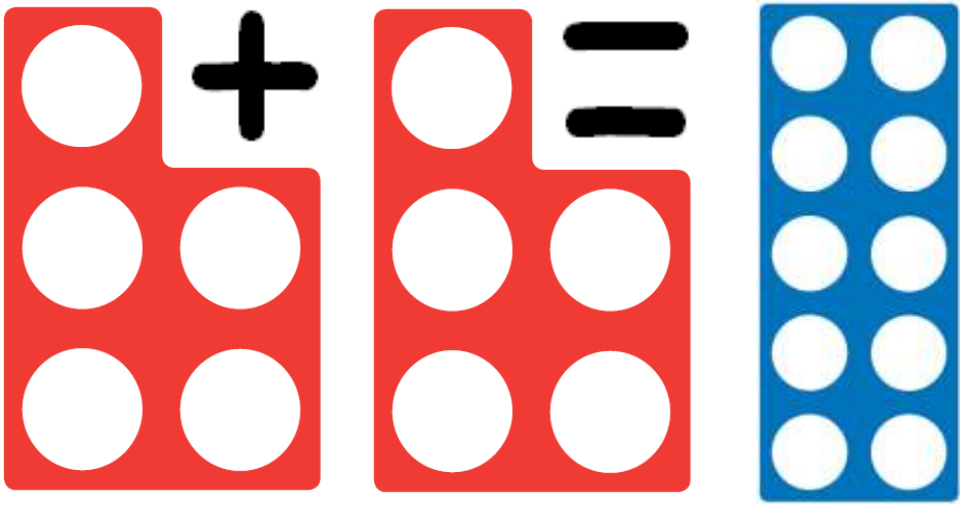
CALCULATION GUIDANCE: Subtraction

	Objective	Concrete	Pictorial	Abstract
Year 2	Column method without regrouping	75 – 42 = 33  Use Base 10 to make the bigger number then take the smaller number away. Show how you partition numbers to subtract. Again make the larger number first.  	 Draw the Base 10 or place value counters alongside the written calculation to help to show working.  	47 – 24 = 23 40 + 7 – 20 + 4 20 + 3 This will lead to a clear written column subtraction. 

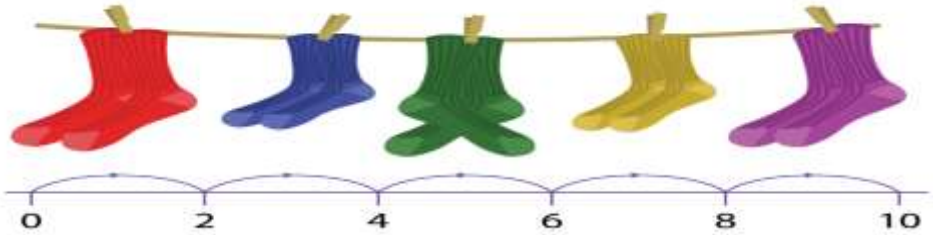
CALCULATION GUIDANCE: Multiplication

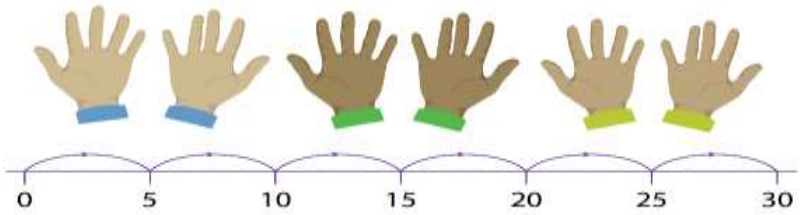
Use pictorial representations and concrete resources to double numbers to 10.





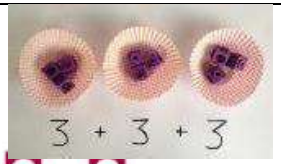
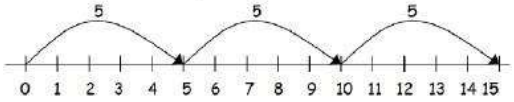
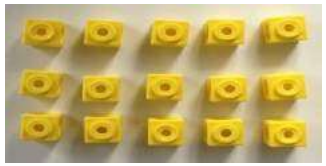
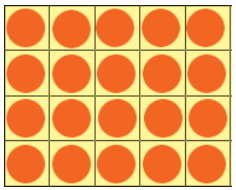
Use concrete sources, role play, stories and songs to begin counting in twos, fives and tens.





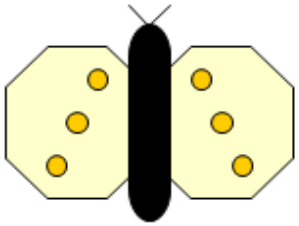
CALCULATION GUIDANCE: Multiplication

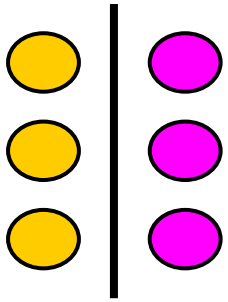
Key language: double, times, multiplied by, the product of, groups of, lots of, equal groups

	Objective	Concrete	Pictorial	Abstract
Year 1/2	Repeated addition	   Use different objects to add equal groups.	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there?  2 + 2 + 2 = 6  5 + 5 + 5 = 15	Write addition sentences to describe objects and pictures.  2 + 2 + 2 = 6
	Arrays- showing commutative multiplication	Create arrays using counters/cubes to show multiplication sentences.  	Draw arrays in different rotations to find **commutative** multiplication sentences.  4 × 2 = 8 2 × 4 = 8  2 × 4 = 8 4 × 2 = 8 Link arrays to area of rectangles. 	Use an array to write multiplication sentences and reinforce repeated addition.  5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

CALCULATION GUIDANCE: Division

Use pictorial representations and concrete resources to halve numbers to 10.



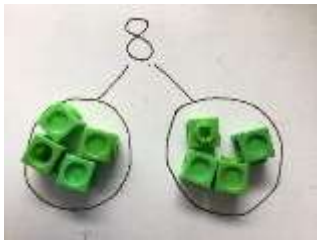
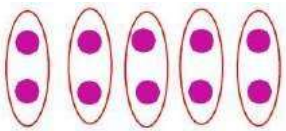
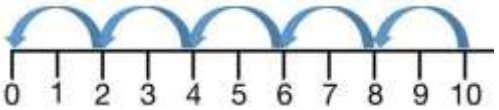
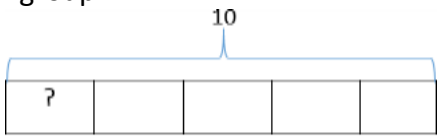


Begin to share quantities using practical resources, role play, stories and songs.

Role play example:
It is the end of the party and the final two teddies are waiting for their party bags. Provide empty party bags and a small collection of items such as gifts, balloons and slices of cake. Ask the children to share the objects between the two bags.

CALCULATION GUIDANCE: Division

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

	Objective	Concrete	Pictorial	Abstract
Year 1/2	Sharing	I have 8 cubes, can you share them equally between two people?	Children use pictures or shapes to share quantities.  8 ÷ 2 = 4	Share 8 buns between two people. 8 ÷ 2 = 4 
	Grou ping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding.  	Use a number line to show jumps in groups. The number of jumps equals the number of groups.  Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group.  10 ÷ 5 = ? 5 x ? = 10	10 ÷ 5 = 2 Divide 10 into 5 groups. How many are in each group?