Calculations policy

Independent Learners for Life

whatever it takes

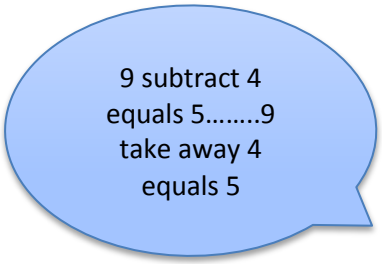
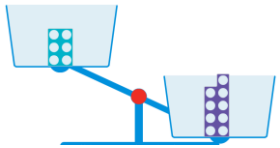
Year 1

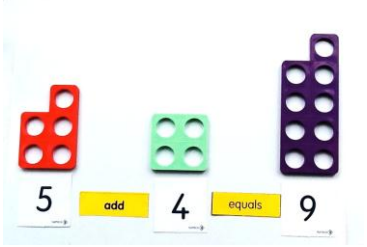
ADDITION AND SUBTRACTION

Year group **1**

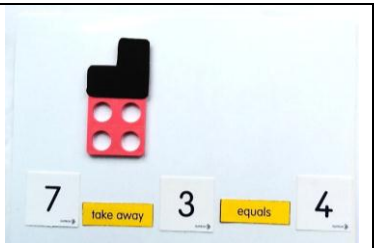
NC end of year statements	**NC Non statutory guidance**
• read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs • represent and use number bonds and related subtraction facts within 20 • add and subtract one-digit and two-digit numbers to 20, including zero • solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ – 9.	• memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations. • combine and increase numbers, counting forwards and backwards. • discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.
Pre-requisite skills	**Associated skills**
• Recite numbers in order and count objects accurately to at least 30. • Read and write numbers from 1 to 20 • Know one more and one less than a number within the number range • Use number names as nouns as well as adjectives • Represent numbers using concrete objects and pictorial representations including the number line and begin to recognise place value • Recognise patterns within the number system up to 20 e.g. that the next number in the counting sequence is 1 more than the last number; that teens numbers follow the same patterns as numbers up to 10. • • Work out how many in a group of objects greater than 10 by arranging into Numicon tens patterns and ones • Record mathematical tasks informally using numerals, diagrams, Numicon shapes/patterns or other structured images • Compare and order numerals to 20 using appropriate language e.g. more/less, bigger/smaller	• Count to 100 and above, forwards and backwards, from 0 or any number. • Demonstrate understanding of teens numbers by building with structured apparatus. • Build 2 digit numbers with a variety of structured apparatus, Numicon, tens frames and Base 10 • Read, write and order numbers to 100 in numerals • Partition 2 digit numbers into tens and ones • Count in ones, twos, fives and tens • Recognise odd and even numbers • Understand equivalence in coin values • Use language greater, smaller, heavier, lighter to compare 2 quantities • Understand and use comparative language more than less/fewer than, equal to, most, fewest, least

Number facts
• Know by heart addition and subtraction facts for all numbers up to and including 10 and use these to derive +/- facts within 20. • Know all doubles facts of numbers up to 5 and corresponding halves

ADDITION	OPPORTUNITIES FOR PROBLEM SOLVING	SUBTRACTION
Recognise addition in problems involving combining and increase *There are 4 blue pencils in my pencil case and 2 red pencils. Altogether I have 6 pencils.* *4 children are playing on the climbing frame. 2 more joined them. Now there are 6 children.*	Know that there is sometimes more than one answer to a question *Find me 3 Numicon shapes that make 10. Can you do it a diferent way?* Use structured apparatus to systematically organise addition and subtraction facts: *How many different ways can you make 9 with 2 Numicon shapes? How do you know you have got all the ways?* *Find all the dominoes with 8 spots altogether. Can you arrange them in a pattern?*	Recognise subtraction in problems involving partitioning and decrease (take away/fewer/less) *There are 6 crocodiles in the river. 2 climb out on to the bank. How many are left in the river?* *There are 8 bananas. Four children have one each, how many bananas are left?*
Add 1 digit numbers with a total no greater than 10 without counting in ones		Subtract numbers within 10 without counting back in ones
Use a variety of equipment to solve an addition problem and say the corresponding number sentence, using a range of language associated with addition 5 plus 3 = 8 3 more than 5 =8	Begin to recognise the relationship between addition and subtraction by exploring parts and wholes Use 3 Numicon shapes 2,4 and 6 and say the additions and subtractions from these e.g. 2 + 4 = 6, 4 + 2 = 6, 6 – 4 + 2, 6 – 2 = 4 Solve simple real life problems involving money Use Numicon. What happens when you add: 2 even numbers 2 odd numbers an even and an odd number Can you explain what happens? **Missing numbers (**using a range of practical resources to support) What numbers go in the boxes? 9 + ☐ = 10 10 - ☐ = 9 6 + ☐ = 9 10 - ☐ = 3	Use a variety of equipment to solve a subtraction problem and say the corresponding number sentence, using a range of language associated with subtraction 
Know when to use addition to solve a problem		Know when to use subtraction to solve a problem
Record addition calculations in a written number sentence: • Record number sentence as spoken e.g ‘6 plus 3 equals 9’ using words and numerals	 **Is it true that?** Is it true that 3 + 4 = 4 + 3?	Record subtraction calculations in a written number sentence*: • Record number sentence as spoken e.g ‘9 take away 3 = 6’ using words and numerals • Use a variety of words to denote subtraction

<table>
<tr>
<td> 

• Use a variety of words to denote adding e.g. add, plus, and , more.
Replace ‘addition’ words with + symbol</td>
<td>Continue the pattern:
0 + 1 = 1
0 + 2 = 2
0 + 3……..

10 + 1 = 11
10 + 2 = 12
10 + 3……</td>
<td>e.g. subtract, take away, minus.
Replace ‘subtraction’ words with – symbol
 
</td>
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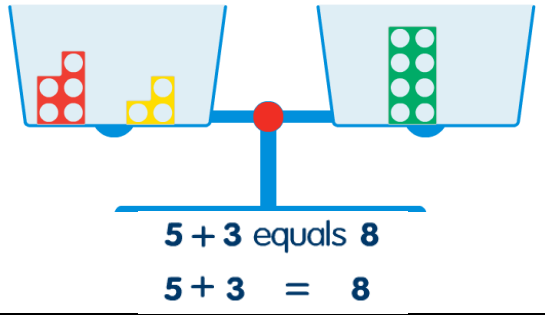
<tr>
<td>Introduce symbols for equals (=) signs alongside appropriate language. Use Numicon balance scale to demonstrate that equivalence means ‘has the same value as’
 
</td>
<td>Missing symbols
Which symbols go in the box to make this number sentence correct?
6 ☐ 3 ☐ 9
7 ☐ 2 ☐ 9
10 ☐ 4 ☐ 6

I am thinking of 2 numbers with a difference of 3. What could they be?

Fact families
Can you write some number sentences using these numbers?
3 2 5

Estimating
Which number sentences will give an answer greater than 5?
3 + 4 10 - 8 2 + 1 10 - 3

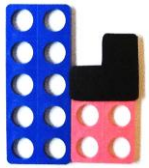
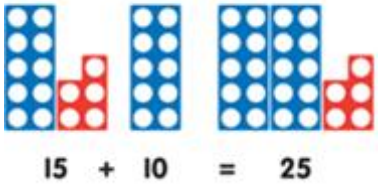
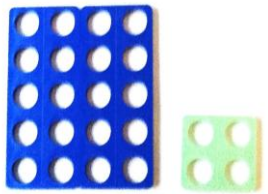
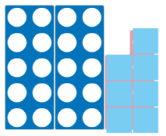
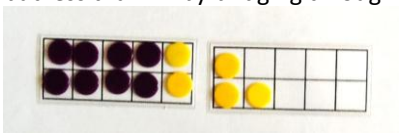
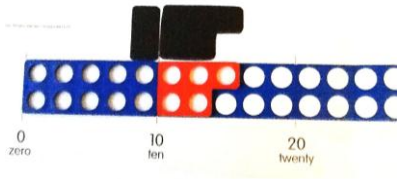
What else do you know?
If you know 5 + 3 = 8, what other facts do you know?

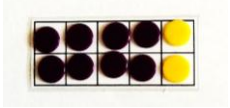
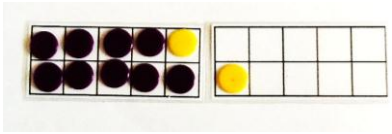
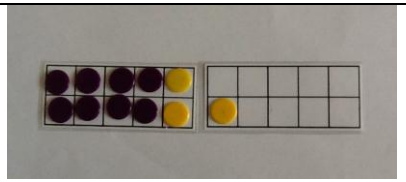
NRICH:

2,4,6,8
How Do You See it?

What Could It Be?

Domino Sorting</td>
<td>Understand that by subtracting 1, the answer is the previous number in the counting sequence</td>
</tr>
<tr>
<td>Solve missing number problems in addition:
4 + ☐ = 6 ☐ + 2 = 6 8 = 2 + ☐ 8 = ☐ + 2</td>
<td></td>
<td>Solve missing number problems in subtraction such as 6 - ☐ = 4 ☐ -2 = 4 7 = 9 - ☐ 7 = ☐ - 2</td>
</tr>
<tr>
<td>Know that adding can be done in any order.</td>
<td></td>
<td>Understand that by subtracting 0, the number remains unchanged</td>
</tr>
<tr>
<td>Understand that by adding 1, the answer is the next number in the counting sequence</td>
<td></td>
<td>Use structured apparatus to show differences between numbers up to 10 and to solve difference problems in context e.g. measuring, data handling</td>
</tr>
<tr>
<td>Understand that by adding 0, the number remains unchanged</td>
<td></td>
<td>Understand ‘How many more’ as a way of solving a subtraction problem and use structured apparatus to find the answer</td>
</tr>
<tr>
<td>Use different strategies to add 3 single digit numbers e.g. finding pairs to 10 and identifying near doubles</td>
<td></td>
<td>Relate “how much more?’ to giving change</td>
</tr>
<tr>
<td>Recognise that a teens number is 10 + U</td>
<td></td>
<td>Subtract 10 from a teens number without counting</td>
</tr>
<tr>
<td>Use structured apparatus or known facts to 10 to add a single digit to a teens number where the total is not</td>
<td></td>
<td>Use structured apparatus or known facts to 10 to subtract a single digit from any number up to 20.</td>
</tr>
</table>

greater than 20 14 + 3 = 17 	**One Big Triangle** **Ladybirds in the Garden** **Number Lines** **Pairs of Numbers** **Weighted Numbers** **Butterfly Flowers** **Two Dice** **Find the Difference** **Sort Them Out (1)**	17 - 3 = 14 
Partition teens numbers into 10s and write the corresponding addition sentences 13 = 10 + 3		Partition teens numbers into 10s and and write the corresponding subtraction sentences 19 – 9 = 10 19 – 10 = 9
Add 10 to a teens number  15 + 10 = 25		Use structured apparatus to subtract 10 from a teens number
 Use knowledge of place value to add a U to a multiple of 10. 20 + 4 = 24		 27 – 7 = 20 Use knowledge of place value to say what remains when the unit is subtracted from a 2 digit number
Add 2 units together where the total is greater than 10 but less than 21 by bridging through 10.  8 + 5 = 13		 0 zero 10 ten 20 twenty 15 – 7 = 8 Subtract a unit from a number up to 20 by bridging through 10 if necessary.
Begin to use knowledge of facts to 10 to calculate total above 10 Use facts to 10 to say the addition facts to 11 or 12		Begin to use knowledge of facts to 10 to calculate with numbers above 10 Use addition facts for 11 or 12 to say the corresponding subtraction facts for 11 or 12

 8 + 2 = 10  9 + 2 = 11		 8 + 3 = 11 so 11 – 8 = 3 11 – 3 = 8

Notes: Include resources from NRICH website
*Teach + (addition) and = (equals) symbols before - (subtraction)
Calculations to be done initially with structured apparatus. Pupils are ready to record when they can demonstrate understanding using apparatus and explain what they are doing.
Recording then follows, initially alongside the use of apparatus and then without apparatus. Although teacher may model different methods of recording, recording should be child led.

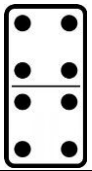
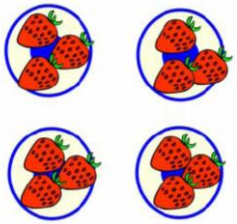
MULTIPLICATION AND DIVISION

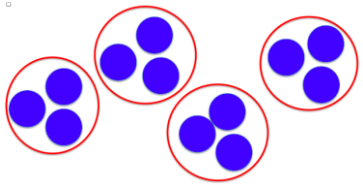
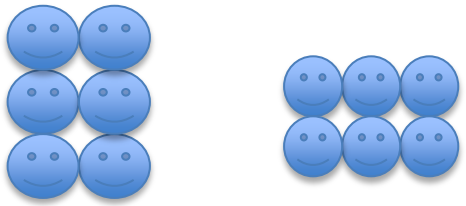
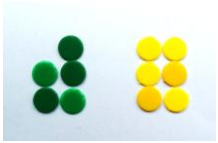
Year group **1**

NC end of year statements	**Non statutory guidance**
• 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. • recognise, find and name a half as one of two equal parts of an object, shape or quantity • recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities. They make connections between arrays, number patterns, and counting in twos, fives and tens.
Pre-requisite skills • Recognise when groups are equal or not • Adjust objects in 2 sets to make both sets equal • Count in 1's, 2's 5's and 10's within number range.	**Associated skills** • Count to 100 and above, forwards and backwards, from 0 or any number. • Build 2 digit numbers with a variety of structured apparatus, Numicon, tens frames and Base 10 • Read, write and order numbers to 100 in numerals • Partition 2 digit numbers into tens and ones • Recognise odd and even numbers • Understand equivalence in coin values • Recognise repeating patterns e.g. ababab … abcabcabc……

Number facts
• Count in multiples of 2s, 5s and 10s • Know all doubles facts of numbers up to 5 and corresponding halves

MULTIPLICATION	**OPPORTUNITIES FOR PROBLEM SOLVING**	**DIVISION**
Recognise doubles *Can you find all the double dominoes? Can you put them in order?*	**Spot the mistake** Use a puppet to count but make some deliberate mistakes. e.g.2 4 5 6 10 9 8 6 See if the pupils can spot the deliberate mistake and correct the puppet Use Cuisenaire Rods to make different 'trains'. *Find the dark green rod. Now make a train with the red rods which is exactly the same as the green rod train. Can you*	Recognise halves as 2 equal parts of a shape or group of objects.

Demonstrate understanding of equal groups of objects, such as 3 groups of 2 or 2 groups of 10 and link this with counting in multiples of 2, 5 or 10.	*make any other trains that are just one colour?* *Can you describe your trains? How many red rods did you need? So how many reds make a green?* **Making links** *If we give each teddy two apples, how many apples will three teddies have?* *Here are 10 Lego people. If 5 people fit into a train carriage, how many carriages do we need?* *If we put two pencils in each pencil pot how many pencils will we need?* Make Numicon 'sandwiches'. The sandwich must be filled with the same filling. E.g. 3 yellow pieces of chesse inside the 9 sandwich. What other sandwiches can you make that contain lots of the same filling? NRICH: **Lots of Biscuits!** **Share Bears**	Solve real life division problems involving sharing and grouping using concrete equipment *There were 10 cakes in this box. Half of them have been eaten. How many are left?* Record informally using own pictures/diagrams and notation.
Count in 2's 5's and 10s and describe the pattern. Link counting in multiples with finding out how many in equal groups e.g. pairs of socks, fingers on hands, pencils in boxes, counting 2ps, 5ps and 10p		Recognises halves as the inverse of doubles  Double 4 is 8 and half of 8 is 4
Find the total number of objects in repeated sets representing the groups using Numicon and where appropriate counting up in multiples e.g. 2's, 5's and 10's. 2, 4, 6, 8, 10….. 5, 10, 15, 20, 25….. Link to counting along in multiples on a counting stick and number line		Recognise quarters as 4 equal parts of a shape or group of objects. 
Use Numicon to recognises equivalence in coins e.g. that two 1ps make a 2p, two 5ps make a 10p and five 2ps make a 10p		Begin to recognise that when an odd number is shared between 2, there will be one left over.
Respond to real life one step problems involving multiplication by representing equal groups of objects *Work out how many wheels are needed for 3 toy cars by putting them in 3 groups of 4.*		

Chews cost 5p each. How much will 3 chews cost? Recording to be child initiated/led using concrete objects and leading to pictorial representations		
Relate repeated groups to repeated addition number sentence  3 + 3 + 3 + 3 = 12		
Respond to instructions to arrange objects in groups  3 groups of 2 2 groups of 3		
Recognise even numbers/quantities as those which can be put into pairs equally and odd numbers/quantities as those which when put into pairs will have an 'extra' one. 		

Additional resources

White Rose Maths - fluency, reasoning, problem solving - whiterosemaths.com

Numbots - fluency - bit.ly/stmargsnumbots

Nrich - reasoning, problem solving - nrich.maths.org

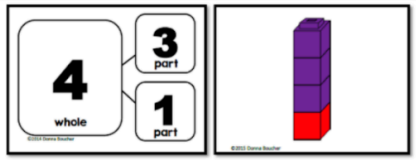
Year One Maths Organiser

Doubles	
6	12
7	14
8	16
9	18
10	20

Halves	
12	6
14	7
16	8
18	9
20	10

Symbols and Language	
+	plus add
-	minus subtract
=	is equal to
5 – 3 = 2	difference
odd numbers	numbers ending with 1, 3, 5, 7 or 9
even numbers	numbers ending with 2, 4, 6, 8 or 0

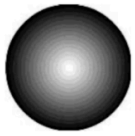
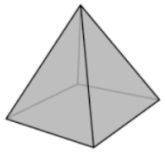
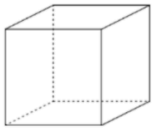
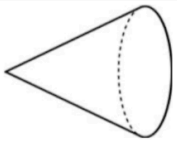
Derived Facts



part + part = whole	3 + 1 = 4
part + part = whole	1 + 3 = 4
whole - part = part	4 - 3 = 1
whole - part = part	4 - 1 = 3

2D Shapes	
circle	1 curved side 0 vertices
triangle	3 straight sides 3 vertices
rectangle	4 straight sides 4 right-angled vertices

3D Shapes

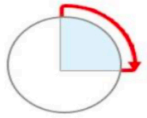
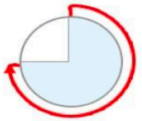
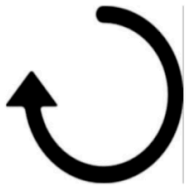
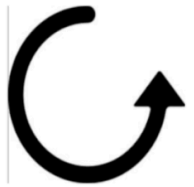
sphere	
pyramid	
cube	
cuboid	
cone	
cylinder	

Numerals and Number Names			
0	zero	10	ten
1	one	20	twenty
2	two	30	thirty
3	three	40	forty
4	four	50	fifty
5	five	60	sixty
6	six	70	seventy
7	seven	80	eighty
8	eight	90	ninety
9	nine	100	one hundred

Number Bonds Within 10

6	0 + 6, 1 + 5 2 + 4, 3 + 3
7	0 + 7, 1 + 6 2 + 5, 3 + 4
8	0 + 8, 1 + 7, 2 + 6 3 + 5, 4 + 4
9	0 + 9, 1 + 8, 2 + 7 3 + 6, 4 + 5
10	0 + 10, 1 + 9, 2 + 8 3 + 7, 4 + 6, 5 + 5

Turns

Quarter Turn	Three-quarter Turn
 1 right angle quarter turn 90°	 3 right angles 3 quarter turns 270°
Clockwise	Anti-Clockwise
	

Time

Half Past		The long minute hand points to six and the short hour hand points past the hour.
24 hours in a day.		60 minutes in an hour
60 seconds in a minute		
A.M. - Morning		P.M. - Afternoon
Midday – 12:00PM		Midnight – 12:00AM

Place Value Grid

	tens	ones
Numeral	10	1