Chestnut Lane Calculation Policy

About the policy

The following calculation policy has been devised to meet requirements of the National Curriculum 2014 for the teaching and learning of mathematics. It is also designed to give pupils a consistent and smooth progression of learning in calculations across the school. Please note that early learning in number and calculation in Reception follows the "Development Matters" EYFS document, and this calculation policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

It is essential that when teaching calculation the three aims of the National Curriculum 2014 are fulfilled;

<div align="center">

Fluency, Problem Solving and Reasoning.

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Age stage expectations

The calculation policy is organised according to age stage expectations as set out in the National Curriculum, **however it is vital that pupils are taught according to the stage that they are currently working at,** being moved onto the next level as soon as they are ready, or working at a lower stage until they are secure enough to move on.

Providing a context for calculation

It is important that any type of calculation is given a real life context or problem solving approach to help build children's understanding of the purpose of calculation, and to help them recognise when to use certain operations and methods when faced with problems. This must be a priority within calculation lessons.

Choosing a calculation method

Children need to be taught and encouraged to use the following processes in deciding what approach they will take to a calculation, to ensure they select the most appropriate method for the numbers involved.

Key number skills for Addition in EYFS:

40-60 months:

- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting
- Begin to identify own mathematical problems based on own interests and fascinations
- Finds one more or one less from a group of up to five objects, then ten objects
- Count out up to six objects from a larger group
- Estimate how many objects they can see and checks by counting them
- Find the total number of items in two groups by counting all of them
- Use the language of 'more' and 'fewer' to compare two sets of objects
- Say the number that is one more than a given number
- Records, using marks that they can interpret and explain

Early Learning Goal:

- count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.
- Using quantities and objects, add and subtract two single-digit numbers and count on or back to find the answer.

Exceeding:

- Solve practical problems that involve combining groups of 2, 5 and 10, or sharing into equal groups
- Estimate a number of objects and check quantities by counting up to 20.

Key number skills needed for Addition in Year 1:

- Count to and across 100, forwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s
- given a number, identify 1 more
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, most, least
- read and write numbers from 1 to 20 in numerals and words
- read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- represent and use number bonds within 20
- add one-digit and two-digit numbers to 20, including 0
- solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems

Example in a context:

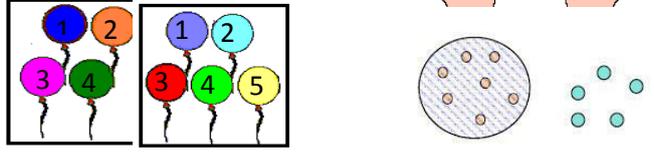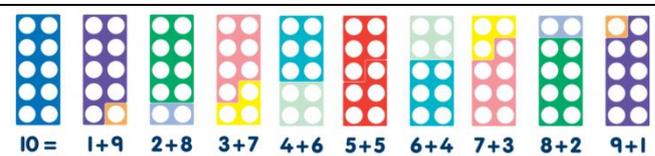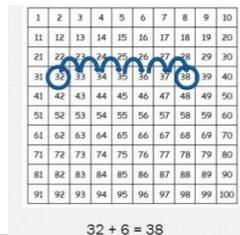Ben has 9 conkers. Sam has 5 conkers. How many conkers do they have when they put them altogether?
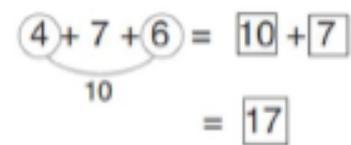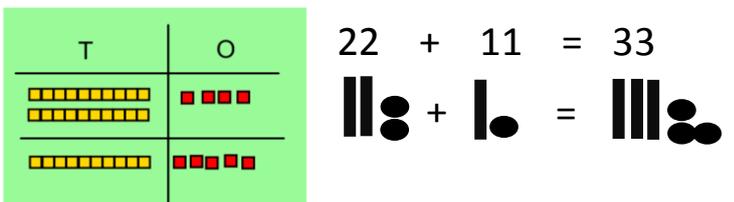
Key number skills needed for Addition in Year 2:

- identify, represent and estimate numbers using different representations, including the number line
- Solve problems with addition using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying increasing knowledge of mental and written methods
- recall and use addition facts to 20 fluently, and derive and use related facts up to 100
- add numbers using concrete objects, pictorial representations, and mentally, including; a **two-digit number and 1s**, a **two-digit number and 10s**, **2 two-digit numbers**, adding **3 one-digit numbers**
- show that addition of 2 numbers can be done in any order (commutative)
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Example in a context:

A group of children were growing a sunflower. The first week it grew 23 cm. The second week it grew 28cm. How tall was the flower after two weeks?

Addition

Step	Step Explanation	Examples
One	The basics of addition are routed in counting. The first thing a child will do is order numbers.	
Two	Children add 'one more' using concrete objects and pictorial representations and then learn to group 2 sets of objects.	
Three	They begin to add two single digit numbers together using objects and pictorial representation. Then move to single jumps on a number line and resources.	
Four	Children will learn and apply number bonds to 5, 10 and 20, using songs, washing lines, diagrams and pictures	10 = 1+9 2+8 3+7 4+6 5+5 6+4 7+3 8+2 9+1
Five	Children need to add a single digit number to a two digit number, using a number line then a 100 square.	32 + 6 = 38
Six	Children add 3 single digit numbers. They learn the skill of using number bonds to combine to numbers and then adding on.	$4 + 7 + 6 = \boxed{10} + \boxed{7}$ 10 $= \boxed{17}$
Seven	They learn to add two 2-digit numbers using resources (diennes) and pictorial form (sticks and dots) to show Tens and Ones and a number line by counting in jumps of 2's,10's.	22 + 11 = 33
Eight	Children need to partition 2-digit numbers into tens and units (ones) and add the sections together. **(Banana method)**	43 + 35 = 78 **T:** 40 + 30 = 70 **U:** 3 + 5 = 8 ●(Altogether): 70 + 8 = 78
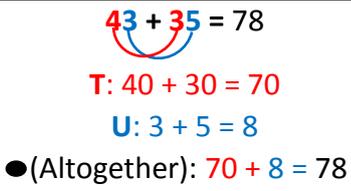
Key Vocabulary:

Digit, value, calculations, number sentences, number bonds, number line, add, more, plus, make, sum, total, altogether, units, ones, tens, partition.

Key number skills for Subtraction in EYFS:

40-60 months:

- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting
- Begin to identify own mathematical problems based on own interests and fascinations
- Finds one more or one less from a group of up to five objects, then ten objects
- Count out up to six objects from a larger group
- Estimate how many objects they can see and checks by counting them
- Find the total number of items in two groups by counting all of them
- Use the language of 'more' and 'fewer' to compare two sets of objects
- Say the number that is one more than a given number
- Records, using marks that they can interpret and explain

Early Learning Goal:

- count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.
- Using quantities and objects, add and subtract two single-digit numbers and count on or back to find the answer.

Exceeding:

- Solve practical problems that involve combining groups of 2, 5 and 10, or sharing into equal groups
- Estimate a number of objects and check quantities by counting up to 20.

Key number skills needed for Subtraction in Year 1:

- count to and across 100, backwards, beginning with 0 or 1, or from any given number
- given a number, identify 1 less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: less than (fewer), most, least
- read and write numbers from 1 to 20 in numerals and words
- read, write and interpret mathematical statements involving subtraction (−) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- subtract one-digit and two-digit numbers to 20, including 0
- solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems

Example in a context:

A tree had 12 leaves on it but 5 flew off in the wind. How many were left?7

Key number skills needed for Subtraction in Year 2:

- identify, represent and estimate numbers using different representations, including the number line
- Solve problems with subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying increasing knowledge of mental and written methods
- recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including; a **two-digit number and 1s**, a **two-digit number and 10s**, **2 two-digit numbers**, adding **3 one-digit numbers**
- Recognise and apply that subtraction of 2 numbers cannot be done in any order.
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Example in a context:

At the beginning of the week I had £1.50 but I spent 38p on sweets on Monday and 23p on Wednesday. How much money do I have left by Friday?

Subtraction

Step	Step Explanation	Examples
One	The basics of subtraction are routed in counting back from a given number.	10 9 8 7 6 5 4 3 2 1
Two	Children learn to subtract one, through the use of songs and fingers. E.g 5 little speckled frogs	**5 - 1 = 4**
Three	They will compared two amounts (single digits) to find the difference using objects and pictures.	
Four	Children will count back using a number line (counting in jumps of 1's.)	6 - 2
Five	Children learn to take a 1 digit number away from a 2 digit number using pictorial methods, then 100 square or a number line.	
Six	Subtract a 2-digit number from a 2- digit number using a number line/100 square in jumps of **tens** and **ones.**	79 – 37 = 42
Seven	Draw their own number line. Then count up to the nearest 10 using number bonds. Then jump in 10's and add the final units. **(Shop Keepers Method)**	$83 - 58 = 25$ +2 +10 +10 +3 58 60 70 80 83 10 + 10 = 20 2 + 3 = 5

Key Vocabulary:

Difference between, subtract, take away, minus, fewer, least, fewest, less, smallest, digit, value, calculations, number sentences, number bonds, number line, units, ones, tens, inverse.

Key number skills needed for Multiplication in EYFS:

Early Learning Goal:

- Solve problems, including doubling, halving and sharing.

Exceeding:

- Solve practical problems that involve combining groups of 2, 5 and 10, or sharing into equal groups

Key number skills needed for Multiplication in Year 1:

- solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- count in multiples of 2s, 5s and 10s

Example in a context:

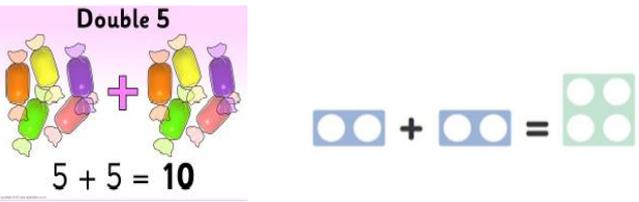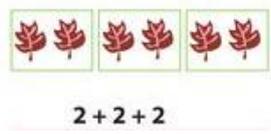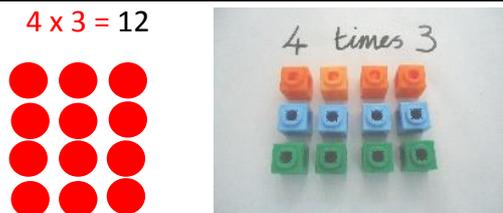A duck has 2 legs. How many legs do 3 ducks have?

Key number skills needed for Multiplication in Year 2:

- count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward
- recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and write them using the multiplication (×), and equals (=) signs
- show that multiplication of 2 numbers can be done in any order (commutative)
- solve problems involving multiplication using materials, arrays, repeated addition, mental methods, including problems in contexts

Example in a context:

Annie has 6 rabbits and she wants to give each of them 5 carrots. How many carrots does she need to buy?

Multiplication

Step	Step Explanation	Examples
One	After counting in ones, the children begin to count in other multiples, e.g. two, fives and tens using concrete objects and bead strings	
Two	Children begin to double numbers with concrete objects and pictures.	Double 5 5 + 5 = **10**
Three	Repeated addition is introduced with practical objects and pictures. E.g 2+2+2=6	2 + 2 + 2
Four	**Arrays** are used to show multiplication in a pictorial form. This also illustrates repeated addition. We begin to talk about 'lots of' e.g. 2+2+2 is the same as 3 lots of 2. And the 'X' symbol is introduced	4 x 3 = 12 4 times 3
Five	Children learn to apply number knowledge for 2's, 3s, 5's and 10's to write repeated addition on a number line. They need to record the jumps and the number they 'land on'. **(Repeated addition on a number line)**	5 x 7 = 35 1 2 3 4 5 6 7 0 5 10 15 20 25 30 35
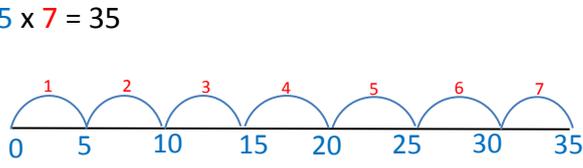
Key Vocabulary:

lots of, groups of, times, multiply, multiply by, count in twos, threes, fives, tens (forwards from), once, twice, three times, five times, repeated addition, array, row, double.

Key number skills needed for Division in EYFS:

Early Learning Goal:

- Solve problems, including doubling, halving and sharing.

Exceeding:

- Solve practical problems that involve combining groups of 2, 5 and 10, or sharing into equal groups

Key number skills needed for Division in Year 1:

- solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- count in multiples of 2s, 5s and 10s

Example in a context:

Arif had 18 sweets. He shared them equally between himself and one friend. How many sweets did they have each?
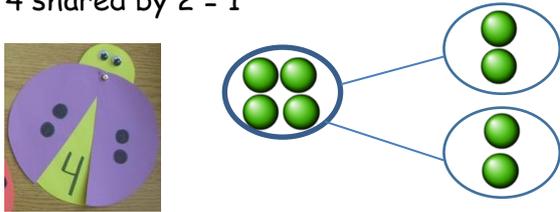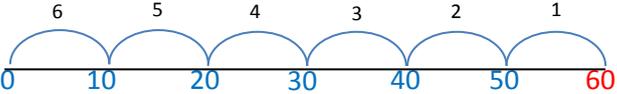
Key number skills needed for Division in Year 2:

- count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward
- recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements division and write them using the division (÷) and equals (=) signs
- Recognise and apply that division cannot be done in any order.
- solve problems involving division, using materials, groups, repeated subtraction, mental methods, including problems in contexts.

Example in a context:

Samil has 40 crayons. He has to share them between 5 crayon pots. How many crayons does he need to put in each pot?

Division

Step	Step Explanation	Examples
One	Children learn to share objects into two equal groups and the concept of 'halving' is introduced. Use the language of 'odd' and 'even', identifying that odd numbers cannot be halved equally.	4 shared by 2 = 1
Two	Children share into equal sets or groups using concrete objects and pictures.	
Three	Children will draw their own representations of groups of objects using circles and dots.(**Groups of** method)	15 ÷ 3 = 5
Four	Children learn to apply number knowledge for 2's, 3's, 5's and 10's to write repeated subtraction on a number line. They need to record the jumps and the number they 'land on'. **(Repeated subtraction on a number line)**	60 ÷ 10 = 6
Five	They begin to explore and use number facts to help with division number sentences (inverse). e.g. 5 x 3 = 15. 15 ÷ 3 = 5 and 15 ÷ 5 = 3	
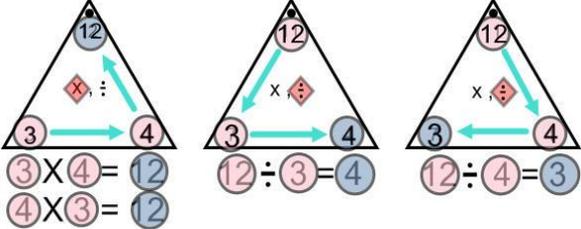
Key Vocabulary:

Share, share equally, equal groups of, divide, divided by, left, left over, share, split, separate, repeated subtraction, group of, pairs, odd, even, half.