

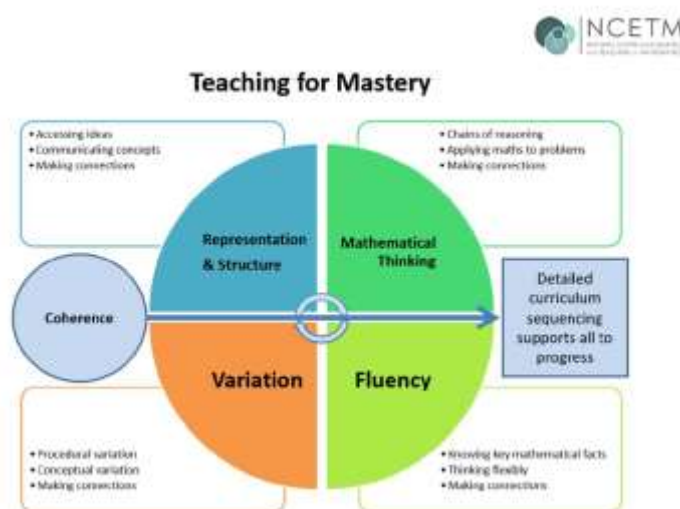
Chestnut Lane Calculation Policy



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 children 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 statutory Early Years framework with guidance from *Development Matters (2021)*, and this calculation policy is designed to build on progressively from the content and methods established in the Early Years Foundation Stage.

At Chestnut Lane, we ensure our lessons link the '5 Big Ideas' for teaching Mastery;



Teaching is designed to enable a coherent learning progression, providing access for all children to develop a deep and connected understanding of mathematics that they can apply in a range of contexts. We encourage children to vocalise their mathematical understanding, helping to build on previous learning and communicate their ideas and reasoning using precise mathematical language. Practical resources are used to help develop fluency, so children have the flexibility to move between different contexts and representations of mathematics. We recognise that the **Concrete Pictorial Abstract (CPA)** approach is highly effective in the teaching of mathematics to develop conceptual understanding. This approach will vary between year groups and the individual abilities of children within each class. The intention is to support children in 'seeing' the mathematics, rather than using the representation as a tool to 'do' the mathematics. These representations become mental images that students can use to think about mathematics, supporting them to achieve a deep understanding of mathematical structures and connections.

Age stage expectations

The calculation policy is organised according to age stage expectations as set out in the EYFS Framework or National Curriculum. However it is vital that children are taught according to the stage that they are currently working at, being moved onto the next method 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 mathematics lessons.

Education Endowment Foundation (EEF) Improving Maths in EYFS and KS1

This research recommends different strategies to strengthen mathematical understanding within an EYFS and KS1 setting. At Chestnut Lane School, we understand that developing a secure grasp of early mathematical concepts can lead to children making stronger and deeper links. We make the most of moments throughout the day to highlight and use mathematics, for example, in daily routines, play activities, through songs and other curriculum areas. Staff provide high quality and targeted support, whether in maths lessons or through interventions. Training is used to ensure all staff are up-to-date with current strategies to support all learners, including SEN and PPG. We encourage some learners to use manipulatives and representations, as they are a powerful tool for supporting their engagement with mathematical ideas, and can help remove some learning barriers, for example recording in abstract ways.

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:

Children in Reception:

- Count objects, actions and sounds.
- Subitise.
- Count beyond ten.
- Compare numbers.
- Understand the 'one more than/one less than' relationship between consecutive numbers.
- Automatically recall number bonds for numbers 0-5 and some to 10.

Early Learning Goal:

- Subitise (recognise quantities without counting) up to 5.
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

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?



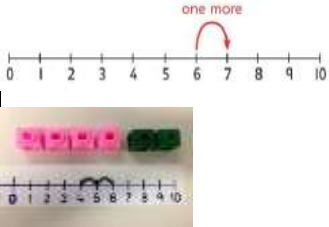
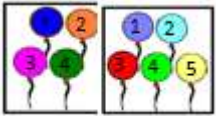
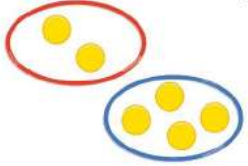
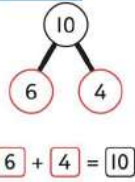

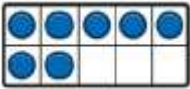
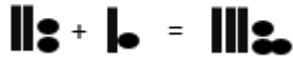

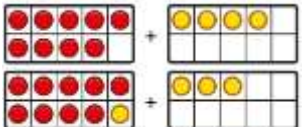
Key number skills needed for Addition in Year 2:

- 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 Key Vocabulary: digit, value, calculations, number sentences, number bonds, number line, add, more, plus, make, sum, total, altogether, units, ones, tens, partition.

Concrete	Pictorial	Abstract
<p>The basics of addition are rooted in counting. The first thing a child will do is order numbers</p> 	<p>Children draw images to help count on</p> 	<p>Use a number line to understand how to link counting on with finding one more and beyond</p>  <p>$6 + 1 = 7$</p> <p>$4 + 2 = 6$</p>
<p>Children add 'one more' using concrete objects</p> 	<p>Children draw to represent the part-part-whole model, and understand the relationship with the whole</p>  <p><i>The parts are 1 and 5. The whole is 6.</i></p>	<p>Use a part-whole model to represent the numbers</p>  <p>$6 + 4 = 10$</p> <p>$6 + 4 = 10$</p>
<p>Children use cubes to bond to 10 and understand how this relates to the addition.</p>  <p>4 and 6 make 10</p>	<p>Children use counters to support and represent their counting on a ten counting frame. Counting on to fill the gaps</p> 	<p>Use dienes or 100 square to bridge 10 when adding larger 2-digit number in a number sentence</p> <p>$22 + 11 = 33$</p> 
<p>Children use Numicon to recall number bonds to 20 and make links with bonds to 10</p>  <p>$1 + 9$ makes 10 so $1 + 19$ makes 20</p>	<p>Children use dienes/counters to complete a ten frame and understand how they can add using knowledge of number bonds to 10</p> 	<p>Children need to partition 2-digit numbers into tens and units (ones) and add the sections together. (Banana method)</p> <p>$43 + 35 = 78$</p> <p>T: $40 + 30 = 70$</p> <p>U: $3 + 5 = 8$</p> <p>●(Altogether): $70 + 8 = 78$</p>

Key number skills for Subtraction in EYFS:

Children in Reception:

- Count objects, actions and sounds.
- Subitise.
- Count beyond ten.
- Compare numbers.
- Understand the 'one more than/one less than' relationship between consecutive numbers.

Early Learning Goal:

- Subitise (recognise quantities without counting) up to 5.
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

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?

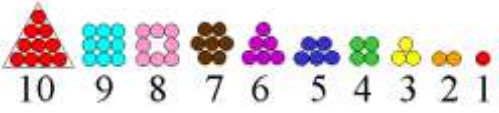



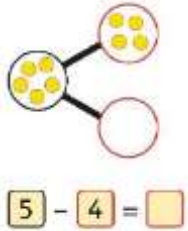
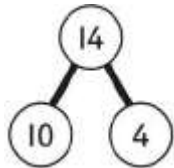

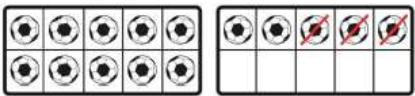



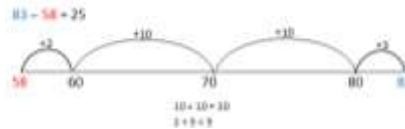
Key number skills needed for Subtraction in Year 2:

- 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 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.

Concrete	Pictorial	Abstract
<p>The basics of subtraction are routed in counting back from a given number, using songs and objects.</p> 	<p>Children cross off images to help subtract</p> 	<p>Children count back using a number line</p> 
<p>Children count objects to separate them into parts, ready to subtract</p> 	<p>Children represent a whole and a part and understand how to find the missing part by subtraction</p> 	<p>Use a part-whole model to support calculation, making links to number bonds</p>  <p>14 - 10 = 4 so 24 - 10 = 14</p>
<p>Use cubes/counters to subtract 1s or 10s.</p> 	<p>Understand when and how to subtract 1s efficiently</p> 	<p>Use a 100 square to subtract larger 2-digit numbers. Moving onto jumping back in tens and ones.</p>  <p>79 - 37 = 42</p>
<p>Use Numicon to work out the difference between 2 numbers</p> 	<p>Use ten frames to represent the efficient method of subtracting 2-digit numbers</p>  <p>First subtract the 10, then subtract 2.</p>	<p>Draw 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)</p>  <p>85 - 58 = 25</p>

Key number skills needed for Multiplication in EYFS:

Early Learning Goal:

- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

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?


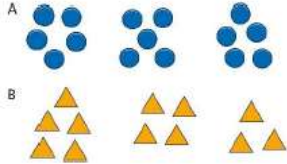

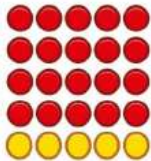
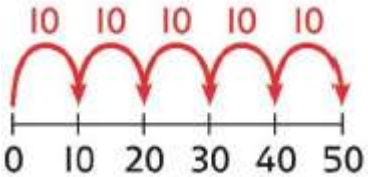


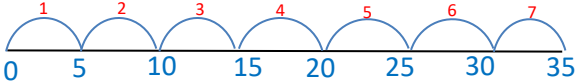
Key number skills needed for Multiplication in Year 2:

- 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 (\times) 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 *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.

Concrete	Pictorial	Abstract
<p>After counting in ones, children to practise counting in other multiples, e.g. 2s, 5s and 10s. Songs are used to encourage this.</p> 	<p>Children draw and represent equal and unequal groups.</p> 	<p>Describe equal groups using words</p> <p>Three equal groups of 4.</p> <p>Four equal groups of 3.</p>
<p>Children arrange objects in equal and unequal groups and understand how to recognise whether they are equal.</p> 	<p>Use counters to form arrays. We begin to talk about 'lots of' e.g. 2+2+2 is the same as 3 lots of 2.</p>  <p>4 groups of 5 ... 5 groups of 5</p>	<p>Use a number line to support repeated addition through counting in 2s, 5s and 10s.</p> 
<p>Children use Numicon/cubes to find doubles</p>  <p>5 + 5 = 10</p>	<p>Draw arrays and the 'X' symbol is introduced begin to think about commutativity.</p> <p>4 x 3 = 12</p> 	<p>Children learn to apply number knowledge for 2's, 3s, 5's and 10's by writing repeated addition on a number line. (Repeated addition)</p> <p>5 x 7 = 35</p> 

Key number skills needed for Division in EYFS:

Early Learning Goal:

- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Key number skills needed for Division in Year 1:

- solve one-step problems involving division, by calculating the answer using concrete objects and pictorial representations 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?


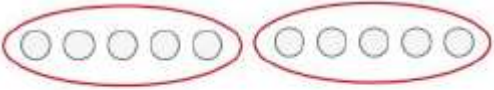
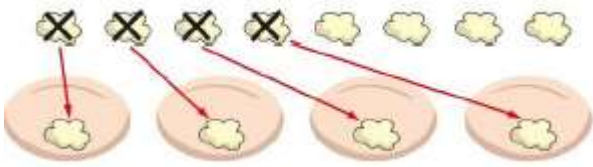

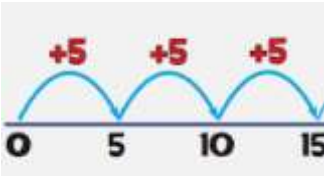


Key number skills needed for Division in Year 2:

- 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 and write them using the division (\div) 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 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.

Concrete	Pictorial	Abstract
<p>Sort a whole set of objects into equal groups</p> 	<p>Represent a whole and work out how many equal groups.</p>  <p><i>There are 10 in total. There are 5 in each group.</i></p>	<p>Describe sharing groups using words</p> <p>If you share 35 by 5 then you get 7 groups</p>
<p>Share a set of objects into equal parts and work out how many are in each part</p> 	<p>Sketch or draw to represent sharing into equal parts. This may be related to fractions.</p> 	<p>Use a number line to support repeated subtraction through counting in 2s, 5s and 10s.</p>  <p>$15 \div 5 = 3$</p>
<p>Children use Numicon/cubes to find halves</p> 	<p>Children will draw their own representations of groups of objects using circles and dots. (Groups of method)</p> <p>$15 \div 3 = 5$</p> 	<p>Children learn to apply number knowledge for 2's, 3s, 5's and 10's by writing repeated subtraction on a number line. (Repeated subtraction)</p> <p>$60 \div 10 = 6$</p> 