



Lickey Hills Calculation Policy

Reception – Year 6

<u>2023</u>



This calculation policy sets out the methods used to help our pupils with calculations and 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, encompassing a mastery approach using Maths No Problem! as a vehicle for this.

Pupils are taught strategies to develop their mental calculation skills and overall number sense, to enable them to become efficient mathematicians. Pupils are regularly exposed to opportunities in which they can apply these mental calculation strategies whilst also being equipped with the reasoning skills to recognise when a written method is more appropriate.

The Calculation Policy shows methods that pupils will be taught within their respective year group. It is organised by operation in order to show progression throughout the school. Children should be confident in choosing and using a strategy that they know will get them to the correct answer; pupils are free to choose their preferred method to solve calculations but are guided towards working most efficiently.

Mathematical understanding is developed through use of representations that are initially concrete (e.g. Dienes, concrete apparatus), combined with pictorial (e.g. arrays, bar models, part whole diagrams) to then facilitate abstract working (e.g. columnar addition, long multiplication). It is important that conceptual understanding, supported by the use of representation, is secure for procedures and if at any point a pupil is struggling with a procedure, they should revert to concrete and/or pictorial resources and representations to solidify understanding.

Where possible, concepts should be taught in the context of real life. Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross-curricular links) to deepen their understanding.



## Addition – EYFS

In EYFS pupils should be developing their concept of the number system through the use of concrete materials and pictorial representations under the guidance of NCETM's Mastering Number programme. They experience practical calculation opportunities using a wide variety of equipment, e.g. small world play, role play, counters, cubes etc. They develop ways of recording calculations using pictures, etc.

<u>Strategies</u>

- Pupils must be provided with opportunities to develop their skills so that they are able to count reliably, including one to one correspondence and count on from a given number.
- Pupils should be given the opportunity to count sets of objects and then combine them to make a total e.g. 6 + 2 = 8
- Emphasis is placed upon subitising quantities 'amount not count'



• Pupils should recognise different ways of making numbers. Eg 6 can be made as:



- Children make a record in pictures, words and symbols.
- Solve different problems using fingers.
- Rekenreks are introduced to count up and to find one more.
- Number lines can be used alongside rekenreks and practical apparatus to solve addition calculations and word problems.
- · Children will need opportunities to look at and talk about different models and images as they move between representations.
- Children become very familiar with part whole relationships, such that they can find smaller numbers within larger numbers.











Addition Year 3	Addition Year 4			
Partition both numbers and recombine. Count on by partitioning the second number only e.g.: 247 + 125 = 247 + 100 + 20+ 5 = 347 + 20 + 5 = 367 + 5 = 372 Children need to be secure adding multiples of 100 and 10 to any three-digit number including those that are not multiples of 10. Number lines can still be used. Introduce the expanded column method using manipulatives first.	Reinforce column method by using concrete materials first			
Add the ones first in preparation for the compact method. Introduce addition with renaming using the compact method with manipulatives first. Show how to rename, with partitioning.	using bar modelling. Show expanded method to make link of place value. Move straight onto compact method. When renaming, the number is renamed directly above the number. Use concrete materials to show renaming. $\frac{4 \ 2 \ 5 \ 6}{1 \ 1 \ 0 \ 0} \frac{4 \ 2 \ 5 \ 6}{6 \ 2 \ 4 \ 3} \frac{4 \ 1 \ 9}{6 \ 2} \frac{1 \ 1 \ 1 \ 9}{6 \ 2}$			
Continue to use bars as a visual model to calculations and exposed to word problems.				



## Addition- Years 5 and 6 Carry on using previous methods taught in previous years to add, using the same terminology. When adding decimals, use place value counters to show addition and use when renaming. IJ £3,70 +£2,95 £ 3.70 + £ 2.95 $\rightarrow$ 01 01 01 01 01 00 01 01 01 01 01 00 00 00 5 00 01 01 01 01 01 00 00 00 6 5 01 01 01 01 00 00 01 01 01 01 01 01 01 01 01 01 00 00 d the tenths



Subtraction - EYFS

Using quantities and objects, subtract two single-digit numbers either count back to find the answer, or utilise their understanding of part whole relationships to identify a missing part.

Pupils should count out a group of objects, more some away and recount the total. 8-3 = 5



After pupils have recognised different ways of making numbers, they should use this number bond knowledge to help with subtraction facts.



Children should use concrete materials to start counting back in order to solve subtraction problems. 8 - 3 = 5

1	6	2	3	4	5 (	6	7	8
1	31	1	т	1	4	Y	74	-
0	1	2	3	4	5	6	7	8

Children can make a record in pictures, words and symbols.

Emphasis is placed upon subitising quantities – 'amount not count'

Solve different problems using fingers.

Children will need opportunities to look at and talk about different models and images as they move between representations.







	Pupils will be exposed to the idea of commutativity to understand	Use a range of resources to subtract and associate to a written				
the idea of fact families.		method (column method)				
	8 + 4 = 10 + 2 8 + 4 = 12	$ \begin{array}{c c} \hline \\ \hline \\$				
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	rew $\begin{bmatrix} tens & ones \\ 2 & 12 \\ -1 & 6 \\ \hline 1 & 6 \end{bmatrix}$ rumber on top.				
	Children should start recalling subtraction facts up to and within 10 and 20, and should be able to subtract zero.					
		Use knowledge of number bonds to subtract.				
		Children should use bars as a visual model to solve subtraction calculations and exposed to word problems.				







Subtraction - Years 5 and 6

Carry on using previous methods taught in previous years to subtract, using the same terminology.

When subtracting decimals, use place value counters to show subtraction and use when renaming









## Multiplication - EYFS

The link between addition and multiplication can be introduced through doubling. Use a range of concrete materials to show a number and then repeat the number to show doubling. Then more onto pictorial representations.









Children will experience equal groups of objects. They should work on practical problem-solving activities. Real life contexts and use of practical equipment to count in repeated groups the same size.



Start to count in 2s, 5s and 10s aloud with objects.

Children are encouraged to visualise and draw multiplication problems in a real-life context. E.g How many fingers on 2 hands? How many legs on 4 ducks?











Multiplication – Year 3	Multiplication – Year 4
Introduce by applying already known knowledge to multiples of 10. Use a 4×8 = 32 4×80 = 320 manipulatives to show.	Pupils should continue to develop their knowledge and understanding of multiplying by a single digit, using short multiplication (the formal written method of compact multiplication). Show expanded method but move straight onto compact method, as in Year 3, to show why and how to regroup.
Consolidate repeated addition before moving onto multiplication of 2 digit numbers. • Multiply the ones digit by the single-digit number • Multiply the tens digit by the single-digit number Show partition to show how this looks, using manipulatives as a supporting mechanism. Show column method alongside. • $Multiply the ones by 4.$ • $Multiply the ones by $	$\frac{1}{2} \frac{3}{6}$ Use different CPA approaches to show the same calculation. $\frac{1}{2} \frac{3}{2} \frac{3}{6}$ Pupils must be $2 \cdot 4 \cdot 120 \cdot 13$ Pupils must be $2 \cdot 4 \cdot 120 \cdot 13$ $2 \cdot 4 \cdot 120 \cdot 120 \cdot 13$ $2 \cdot 4 \cdot 120 \cdot 120 \cdot 120 \cdot 120$ $2 \cdot 4 \cdot 120 \cdot 120 \cdot 120 \cdot 120$ $2 \cdot 4 \cdot 120 \cdot 120 \cdot 120 \cdot 120 \cdot 120$ $2 \cdot 4 \cdot 120 \cdot 1$



Show expanded method for conceptual understanding, but move straight onto the compact method using same techniques and breakdowns. When regrouping, always start with the larger value and write on top of the next digit.



Continue to use CPA approach and visual bars when solving multiplication and division in word problems. 18 blue green 18 × 2 = 36

There are 36 green crayons.



























Division Years - 5 and 6

Carry on using previous methods taught in previous years to divide, using the same terminology. Start with 4 digits divide by I digit before slowly adding further digit.

Show chunking and short division method. When chunking, show partitioning with correct place value.



With remainders, continue with same method but replace new value with a crossing out. Put remainders as r\_\_\_\_ and fraction. In year 6, show to continue with 0s after the decimal point.

