Low Ash Primary School - CPA Calculation \& Representation Policy
Low Ash Primary School
Calculation \& Representation Policy
2023-2024


PRIMARY SCHOOL

This policy has been largely adapted from the white Rose Maths Calculation Policy with some exceptions.
It is a working document and will be revised as necessary.
This calculation policy should be used alongside quality teaching which also involves pupils exploring and refining their own methods thus deepening their mathematical understanding. It is designed to be complimented by the CPA approach to mathematical learning.
More information about how best to use each representation can be found in the accompanying booklet.

Addition

Evolution of the abstract written methods of addition


## YEAR 1

| Skill: Add 1-digit numbers with |  |  |  |  |  |  |  | Year: 1 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $0 \bigcirc 0000$$4+3=7$ |  |  |  |  |  |  |  | When adding numbers to 10, children can explore both aggregation and augmentation. <br> The part-whole model, discrete and continuous bar model, number shapes and ten frame support aggregation. <br> The combination bar model, ten frame, bead string and number track all support augmentation. |

YEAR $1 / 2$


## YEAR 2

Skill: Add three 1-digit numbers

| Skill: Add 1-digit and 2-digit numbers to 100 |  |  |  |  |  |  |  |  |  |  |  | 2/3 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ? <br> , <br> 38 <br> $38+5=43$ |  |  |  |  |  |  |  |  |  |  |  | When adding single digits to a two-digit number, children should be encouraged to count on from the larger number. <br> They should also apply their knowledge of number bonds to add more efficiently e.g. $8+5=13$ so 38 $+5=43$. <br> Hundred squares and straws can support children to find the number bond to 10 . |

YEAR $2 / 3$

| Skill: Add two 2-digit numbers to 100 |  | Year: 2/3 |
| :---: | :---: | :---: |
|  | $38+23=61$38 <br> +23 <br> 61 <br> 1 | At this stage, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient. <br> Children can also use a blank number line to count on to find the total. Encourage them to jump to multiples of 10 to become more efficient. |

## YEAR 3




YEAR 5/6


## YEAR 5/6

Skill: Add with up to 3 decimal places

Subtraction

Evolution of the abstract written methods of subtraction


YEAR 1


## YEAR $1 / 2$



YEAR 2

| Skill: Subtract 1 and 2-digit numbers to 100 | Year: 2 |
| :---: | :---: |
|  | At this stage, encourage children to use the formal column method when calculating alongside straws, base 10 or place value counters. As numbers become larger, straws become less efficient. <br> Children can also use a blank number line to count on to find the difference. Encourage them to jump to multiples of 10 to become more efficient. |

## YEAR 3



YEAR 4


YEAR $5 / 6$
Skill: Subtract numbers with more than $\mathbf{4}$ digits

YEAR $5 / 6$


Multiplication

Evolution of the abstract written methods of multiplication


Skill: Solve 1-step problems using multiplication $\quad$\begin{tabular}{l}
Year: $\mathbf{1 / 2}$ <br>

| lildren represent |
| :--- |
| multiplication as |
| repeated addition in |
| many different ways. | <br>

In Year 1, children use <br>
concrete and pictorial <br>
representations to <br>
solve problems. They <br>
are not expected to <br>
record multiplication <br>
formally.
\end{tabular}

YEAR 3/4



## YEAR 4

## Drawing Factor Bugs the Low Ash way:

-The 'antennae are 1 and the number itself. Therefore, prime numbers have no legs!

- composite numbers have their factor pairs written across the bug in 'pairs of legs. This draws attention to there being an even number of factors and that they feature in pairs.
-Square numbers have a 'sting' where the root is the sting. This is because they have an odd number of factors.


## Prime numbers


composite numbers


Square numbers


## YEAR 5

| Skill: Multiply 4-dig | it nu | b |  | 1-dig | Year: 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | $6 \times$ |  |  | ,478 <br> 0 <br> 6 <br> 3 <br> 8 | When multiplying 4digit numbers, place value counters are the best manipulative to use to support children in their understanding of the formal written method. <br> If children are multiplying larger numbers and struggling with their times tables, encourage the use of multiplication grids so children can focus on the use of the written method. |

## YEAR 5



YEAR 5


## YEAR 5/6

Skill: Multiply 4-digit numbers by 2-digit numbers

Year: 5/6
When multiplying 4digits by 2-digits, children should be confident in using the formal written method.

If they are still struggling with times tables, provide multiplication grids to support when they are focusing on the use of the method.

Consider where exchanged digits are placed and make sure this is consistent.

Division

Evolution of the abstract written methods of division


Step $4 a: 3 / 4$ digit $\div 2$ digit standard short method
0138
$1 7 \longdiv { 2 ^ { 2 } 3 ^ { 6 } 4 ^ { 1 8 } 6 }$


Step $2: 3$ digit $\div 1$ digit standard short method


Step $4 b: 3 / 4$ digit $\div 2$ digit standard long method


Step 3: Finding multiples

N.B: Either step $4 a$ or $4 b$ can be used but method marks in SAT will only be awarded for the method in step 4b. In both cases, pupils should write out the multiples.

Pupils should check their multiples in step 3 by checking the tenth multiple.

## YEAR 1/2



Skill: Solve 1-step problems using division (grouping) $\quad$| Year: $\mathbf{1 / 2}$ |
| :--- |

Skill: Divide 2-digits by 1-digit (sharing with no exchange) $\quad$\begin{tabular}{l}
Year: 3 <br>
\hline Tens

 

When dividing larger <br>
numbers, children can <br>
use manipulatives <br>
that allow them to <br>
partition into tens and <br>
ones.
\end{tabular}

YEAR 3/4


YEAR 4



## YEAR 5



## YEAR 5

| Skill: Divide 4-digits by 1-digit (grouping) |  |  |  |  | Year: 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $8,532 \div 2=4,266$ | 2 | 4 | 2 6 <br> 5 $1_{3}$ | $\frac{6}{12}$ | Place value counters or plain counters can be used on a place value grid to support children to divide 4digits by 1 -digit. Children can also draw their own counters and group them through a more pictorial method. <br> Children should be encouraged to move away from the concrete and pictorial when dividing numbers with multiple exchanges. |

## YEAR 6



## YEAR 6



YEAR 6


