## Infant and Nursery School



## PROGRESSION IN CALCULATION POLICY- Teaching for Mastery

Mastery is for all, and the aim of this policy is to ensure all children leave our school with a secure understanding of the four operations and can confidently use both written and mental calculation strategies in a range of contexts. It aims to ensure consistent strategies, models and images are used across the school to embed and deepen children's learning and understanding of mathematical concepts.

This policy sets out the progression of strategies and written methods which children will be taught as they develop in their understanding of the four operations. Strategies are set out to develop a Concrete, Pictorial, Abstract (CPA) approach to develop children's deep understanding and mastery of mathematical concepts.

Models and images from the White Rose Calculation Policy have been included in this policy.

Article 28
You have the right to a good quality education.
You should be encouraged to go to school to
the highest level you can.

## Kenmore Park Infant and Nursery School Progression in Calculation Policy - Teaching for Mastery



## Kenmore Park Infant and Nursery School Progression in Calculation Policy - Teaching for Mastery

|  | Addition | Subtraction | Multiplication | Division |
| :---: | :---: | :---: | :---: | :---: |
| $\begin{aligned} & \text { न} \\ & \frac{1}{0} \\ & 0 \\ & 2 \end{aligned}$ | Children use concrete and/or pictorial representations of the following: cherry diagrams (part/whole model), cubes, tens frames, Numicon, bar model (part/whole model), bead strings, number-lines. Pupils learn to combine 2 sets and when a quantity is increased by another. <br> Cherry diagrams <br> Tens frame | Children use concrete and/or pictorial representations of the following: cherry diagrams (part/whole model), cubes, tens frames, Numicon, bar model (part/whole model), bead strings, number-lines to support partitioning, reduction and finding the difference. <br> Partitioning <br> Then <br> Now <br> Reduction <br> Finding the difference | Children represent multiplication as repeated addition in many different ways. <br> Children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally. <br> One bag holds 5 apples. <br> How many apples do 4 bags hold? | Children solve problems by sharing amounts into equal groups. <br> Children use concrete and pictorial representations to solve problems. They are not expected to record division formally. <br> There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag? |

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Children should also be taught use of the 100 square to support addition using counting on in ones along the rows and counting on in tens going down a column, both practically and then visualising a mental image.

Count on 10
$11+10=21$
Count on $3 \longrightarrow+3=6$

| 7 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

Children should also be taught use of the 100 square to support subtraction using counting back in ones along the rows and counting back in tens going up a column, both practically and then visualising a mental image.

Count back $3 \quad 8-3=5$

Count
back 10
$13-3=10$
$3 \times 2=6$ ,
$2 \times 3=6$

Kenmore Park Infant and Nursery School Progression in Calculation Policy - Teaching for Mastery





Skill: Solve 1-step problems using multiplication $\quad$| Year: $1 / 2$ |
| :--- |



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



|  | Addition | Subtraction | Multiplication | Division |
| :---: | :---: | :---: | :---: | :---: |
| $$ | Children are taught when adding two digit numbers to partition into tens and ones using Base 10 equipment (Dienes) $\begin{gathered} \left\|\left.\right\|_{30} ^{23}+34\right. \\ 20304 \\ 20+30=50 \\ 3+4=7 \\ 50+7=57 \end{gathered}$ <br> Children are encouraged to use the formal column method when calculating alongside base 10 or place value counters. <br> Children should also be taught use of the 100 square to support addition using counting on in ones along the rows and in tens down the columns, both practically and then visualising a mental image. | Children will begin to use empty number lines to support calculations by counting mon to find the difference. <br> Children are encouraged to use the formal column method when calculating alongside base 10 or place value counters. <br> Children should also be taught use of the 100 square to support subtraction using counting back in ones along the rows and in tens up the columns, both practically and then visualising a mental image. | Children will develop their understanding of multiplication and be introduced to the Multiplication symbol. <br> Repeated addition 3 times 5 is $5+5+5=15$ or 3 lots of 5 or $5 \times 3$ <br> Repeated addition can be shown easily on a number line: $50$ <br> Commutativity <br> Children should know that $3 x$ 5 has the same answer as $5 \times 3$. | Children will develop their understanding of division and be introduced to the division symbol. <br> Sharing equally 6 sweets shared between 2 people, how many do they each get? <br> Grouping or repeated subtraction <br> There are 6 sweets, how many people can have 2 sweets each? <br> $00 / 00 / 00$ <br> Repeated subtraction using a number line $12 \div 3=4$ |

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| Skill: 10 times table |  |  |  |  |  |  |  |  |  | Year: 2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\begin{gathered} 1 \\ \hline 20 \\ \hline \end{gathered}$ | 10 <br> 30 |  | $\frac{1}{50}$ <br> 000 |  |  |  |  | Encourage daily counting in multiples both forwards and backwards. This can be supported using a number line or a hundred square. <br> Look for patterns in the ten times table, using concrete manipulatives to support. Notice the pattern in the digitsthe ones are always 0 , and the tens increase by 1 ten each time. |

Skill: Solve 1-step problems using multiplication $\quad$| Year: $1 / 2$ |
| :--- |



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



## Kenmore Park Infant and Nursery School Progression in Calculation Policy - Teaching for Mastery

## Mathematical Language

The Following Mathematical language will be consistently used by teachers with reference to the four operations, however, children will be taught that there are many different words which apply to the four operations:

The word number sentence will be used with any of the four operations.
Addition: Add Subtraction: Subtract Multiplication: Multiplied by Division: Divided by

