## Hillborough Infant and Nursery School

## Calculation Policy

## Aims and rationale:

Mathematics will be at the core of children's schooling throughout their time at Hillborough Infant \& Nursery School and the need for a clear, progressive policy which is understood throughout the school is vital.
Early practical, oral and mental work must be undertaken in order to lay the foundations of understanding in counting, place value and number facts as well as the four operations of addition, subtraction, division and multiplication.
Children will initially be introduced to number, counting, calculations, shape, measure and geometry through practical, oral and mental activities. Once they begin to understand these concepts they will be encouraged to informally record before finally using mathematical signs and symbols to record in a more organised/ formal way.
This policy explains the methods used to help our pupils with calculations. The methods we are advocating are in line with the new National Curriculum (September 2014). All staff in school work from this document so that we can ensure the consistency of our approach and can make sure that the children move onto the next step when they are ready whilst ensuring appropriate progression through from EYFS to the end of KS1.
Whichever of the four operations of addition, subtraction, multiplication and division is being taught children need to experience all of the following steps to completely understand it:

1. Concrete: use of concreted manipulatives for children to understand the concept.
2. Pictorial including the use of number lines and 100 squares.
3. Abstract including recording as digits and using mathematical symbols.

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|  | - Say number words in sequence - recite numbers past 5 <br> - Develop fast recognition of up to 3 objects, without having to count them individually (Subitise up to 3 objects) <br> - Say one number for each item in order: 1, 2, 3, 4, 5 <br> - Know that the last number reached when counting a small set of objects tells you how many there in total ('cardinal principle') <br> - Show 'finger numbers' up to 5 <br> - Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5 |
| $\begin{aligned} & 0 \\ & \frac{0}{3} \\ & \frac{3}{0} \\ & \frac{2}{3} \\ & \\ & \hline 10 \end{aligned}$ | - Compare quantities using language: 'more than', 'fewer than' <br> - Can identify groups with the same number of things |
|  | - Solve real world mathematical problems with numbers up to 5 <br> - Can physically partition a number of things into two groups, and can recognise that those groups can be recombined to make the same total <br> - Can talk about different arrangements they can see within the whole |
|  | - Experiment with their own symbols and marks as well as numerals. |
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## Hillborough Infant and Nursery School



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| Year |  |
| :---: | :---: |
| Addition |  |
|  | - Read, write and interpret mathematical statements using symbols,,$+-=$ <br> - Represent and use number bonds and related addition facts within 20 <br> - Add one digit and two-digit numbers up to 20, including zero. <br> - Solve one-step problems using concrete objects and pictorial representations, and missing number problems such as $7=-9$ <br> - Given a number, identify (and use the language) one more <br> - Begin to compare (what's the same/different?) for commutative sums e.g $3+7=7+3$ <br> - Memorise and reason with number bonds to 10 \& 20 in several forms <br> - Add using objects, Numicon, cubes etc. and number lines and tracks <br> - Check with everyday objects <br> - Ensure pre-calculation steps are understood, including: <br> $>$ Counting objects (including solving simple concrete problems <br> > Conservation of number <br> > Recognise place value in numbers beyond 20 <br> $>$ Counting as reciting and as enumerating |
|  | $4+3=7$ <br> part-whole model; bar model; number shapes; tens frames; bread strings; number tracks; numicon; straws; number lines (labelled) <br> $8+7=15$ |

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| Year |  |
| :---: | :---: |
| Subtraction |  |
|  | - Subtract one digit and two-digit numbers to 20, including zero. <br> - Read, write and interpret mathematical statements using symbols (,,$+-=$ ) signs. <br> - Represent and use number bonds and related addition facts within 20 <br> - Solve one-step problems using concrete objects and pictorial representations, and missing number problems such as $7=-9$ <br> - Memorise and reason with number bonds <br> - Subtract using objects, Numicon, cubes etc. and number lines and tracks Check with everyday objects <br> - Ensure pre-calculation steps are understood, including: <br> > Counting objects (including solving simple concrete problems <br> > Conservation of number <br> > Recognise place value in numbers beyond 20 <br> > Counting as reciting and as enumerating |
|  | $7-3=4$ <br> Part-whole model; bar model; number shapes; numicon; tens frames; bead strings; number trackers; number lines (labelled); straws |

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| Year |  |
| :---: | :---: |
| Multiplication |  |
|  | - solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. <br> - Count in multiples of twos, fives and tens with equipment, songs \& rhythms, and including by rote <br> - Counting 2 s e.g. counting socks, shoes, animal legs <br> - Counting in 5 s e.g. counting fingers, fingers in gloves, toes <br> - Counting in 10 s e.g. counting fingers, toes |
|  | - Recognising odd and even numbers <br> - Write as a number pattern (e.g. $5,10,15 \ldots, 2,4,6 \ldots ; 10,20,30 \ldots$ ) <br> > It is important to use a range of models to develop understanding of multiplication and that children made connections between arrays, number patterns and counting in twos, fives and tens <br> > Although there is no statutory requirement for written multiplication in Year 1, it may be helpful to encourage children to being to write it as repeated addition sentences in preparation for Year 2. E.g. $2+2+2+2=8$ or $4 \times 2=8$ |
|  | One bag holds 5 apples. <br> How many apples do 4 bags hold? <br> $0 \bigcirc \bigcirc$ $0 \bigcirc 00$ $\begin{gathered} 5+5+5+5=20 \\ 4 \times 5=20 \end{gathered}$ $5 \times 4=20$ |

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| Year |  |
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| Division |  |
|  | Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. (Pupils) make connections between arrays, number patterns, and counting in twos, fives and tens. <br> Count on or back in $2 \mathrm{~s}, 5 \mathrm{~s}$ and 10 s and Songs are useful look for patterns. <br> $>$ Children should experiment with the concepts of sharing and grouping in a number of contexts. Initially they use their own recording - moving towards fluent, symbolic notation in Year 2. <br> $>$ Conceptual understanding and recording should be continuously supported by the use of arrays as a default model, as well as other representations. |
|  | There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag? $20 \div 5=4$ |

## Hillborough Infant and Nursery School

| Year 2 |  |
| :---: | :---: |
| Addition |  |
|  | - Add numbers using concrete objects, pictorial representations, and mentally, including: <br> $>$ a two-digit number and ones <br> $>$ a two-digit number and tens <br> $>$ two two-digit numbers <br> - Adding three one-digit numbers <br> - Recall and use addition and subtraction facts to $\mathbf{2 0}$ facts fluently, and derive and use related facts up to $\mathbf{1 0 0}$ <br> - Demonstrate the commutative law of addition <br> - Re-partition numbers <br> - Use a hundred square <br> - Check calculations using inverse and by adding numbers in different order <br> - Using partitioning to separate tens and units, eg, $54=50+4$ |
| $\begin{aligned} & \text { ग्0 } \\ & \frac{0}{0} \\ & \stackrel{\omega}{\omega} \\ & \stackrel{\omega}{\omega} \\ & \stackrel{\rightharpoonup}{\omega} \\ & \stackrel{\rightharpoonup}{\omega} \\ & \vdots \end{aligned}$ |  $7+6+3=16$ <br> (5) <br> Part-whole model, bar model, tens frames, <br> ? number shapes, numicon, number lines (labelled and blank), straws, hundred squares, base <br> $38+5=43$ 10/dienes, column addition, place value counters |

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| Year |  |
| :---: | :---: |
| Subtraction |  |
|  | Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <br> $>$ a two-digit number and ones <br> $>$ a two-digit number and tens <br> > two two-digit numbers <br> $>$ adding three one-digit numbers <br> Jottings to support informal methods |
|  |  |
|  | Part-whole model, bar model, number lines (labelled), number lines (blank), straws, hundred square, straws, base 10, place value counters, column method |

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