## Leconfield Primary School Calculation Policy

Leconfield Primary School Calculation Policy provides guidance for the methods we use to teach our children the four main operations of mathematics.

Throughout this document you will see examples of questions and the methods which the children will be taught in order to complete the questions.

Alongside these methods we use practical equipment to ensure that all pupils have a solid and secure foundation of the concrete before moving to pictorial representations and then into the abstract.

## Vocabulary we might use

## Addition:

Add
Total
Addend
Altogether How many more Sum Increase

## Subtraction:

Take away Difference
How many less
Subtrahend Decrease Fewer than Minus

Multiplication:
Times Groups of
Lots of
Product
Factor
Multiple
Altogether

## Division:

Share
Group
Divisor
Quotient
Equal parts
Half
Remainder


The part whole model is a tool for partitioning (splitting up a number), addition and subtraction, it shows that one part plus one part equals the whole. It can be used for subtraction to with missing numbers and can be used with counters, tens and ones and also numbers to help children understand how numbers are made.

## The tens frame



The tens frame is an extremely useful tool for understanding number bonds to 10 and also to recognise what 10 looks like.
By using different coloured counters pupils can see how the number 10 is made in different ways.
More than one tens frame can be used to show numbers greater than ten or the counters could be changed to tens in order to represent one hundred.
When becoming familiar with the tens frame children will begin to see that the top line represents 5 and the full frame is 10 . We always encourage the top lined to be completed first to help with this understanding of 5 and 5 .

Methods you might see

## The number line and column method

| 2 | 4 | + | 4 | 8 | $=$ | 7 | 2 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | +20 |  |  | +4 |  |
|  |  |  |  |  |  |  |  |
| 48 |  |  |  | 68 |  |  | 72 |
| 7 | 2 |  | 4 | 8 | $=$ | 2 | 4 |
|  |  |  |  |  |  |  |  |
| 72 |  | -40 |  |  | -8 |  |  |
|  | 1 |  |  |  | 6 |  |  |
|  | 2 | 4 |  |  | 7 | 12 |  |
|  | 4 | 8 | + |  | 4 | 8 | - |
|  | 7 | 2 |  |  | 2 | 4 |  |
|  |  |  |  |  |  |  |  |

## Multiplication and short division.

|  | 3 | 7 | 4 |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  | 6 | $x$ |
| 1 | 8 | 0 | 0 |  |
|  | 4 | 2 | 0 |  |
|  |  | 2 | 4 | + |
| 2 | 2 | 4 | 4 |  |

$374 \times 6=2244$
$(300 \times 6=1800)$
$(70 \times 6=420)$
$(4 \times 6=24)$

Short multiplication and division is used as pupils become more fluent in number facts.

| 4554 | $\div$ | 6 | $=$ | 759 |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |
|  | 0 | 7 | 5 | 9 |
| 6 | 4 | 45 | 35 | 54 |

## Recognising numbers

Subitising - subitising means recognising numbers without having to count.
In nursery we want our children to be able to recognise 1,2 and 3 without counting.


## Counting songs and rhymes

Pupils will learn and join in with counting songs and rhymes. These rhymes might count up or they might count down.


Children will also explore counting forwards and backwards verbally.

## Exploring patterns



Children begin to explore patterns in the learning environment and in activities which they are completing.

Colours might also be used to make patterns.

$\square$

## Positional language

Pupils build up their understanding of positional language.

On, next to, beside, under, down, between.


Where is Teddy?

They begin to use this language to help them describe where things are.

## Subitising

Subitising means that children can recognise a number without counting.

We start this by looking at patterns of numbers, such as on a dice and then random dots for pupils to subitise.
Some children will group these, others will be able to see the number without counting.


## Number bonds to 10



Children will begin to use the tens frame and the part-whole model to be able to identify all of the number bonds to 10 .

Our song:
5 and 5 add up to 10, 6 and 4 make it again. 7 and 3 they also do, Guess what so do 8 and 2.
9 and 1,10 and 0. Looks like you are a number bond hero!


The part whole shows that both parts equal the whole.

## Leconfield calculation policy Reception

## Counting

Accuracy of counting is an essential skill which pupils learn in reception. Some children will be able to subitise, others will need to move the objects to improve their accuracy of counting.


Pupils must also be able to recognise the numeral which represent the number.


## One more and one less

Children will begin to understand the idea of one more and one less.
This will be seen practically, with pupils adding one more or taking one away, but will then become part of their understanding of the numerals.


## Doubling:

Children will also begin to explore doubling, using practical equipment and then looking at dominoes or spots on ladybirds to begin to understand double and what they look like.

## Addition

I can add one digit and two digit numbers to 20.


$$
\begin{aligned}
& 7+9=16 \\
& 16=9+7
\end{aligned}
$$

## Subtraction

I can subtract one digit and two digit numbers from and within 20.


The part whole can be used to show both addition and subtraction.


# Leconfield calculation policy Year 1 

## Multiplication

I can solve one step multiplication problems.


The above array demonstrates 2 groups of 4, but can also show 4 groups of 2 .

$$
\begin{aligned}
& 2 \times 4=8 \\
& 4 \times 2=8
\end{aligned}
$$

## Division

I can solve one step division problems.


In year 1 we would expect the children to share out practically using equipment and then begin to draw this for themselves if confident.
$12 \div 2=6$

I can add two two digit numbers.

| 3 | 5 | + | 5 | 7 | $=$ | 9 | 2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |
|  |  | +30 |  |  |  | + | 5 |
| 57 |  |  |  | 87 |  |  | 92 |
|  |  |  |  |  | 1 |  |  |
|  | 3 | 5 |  |  | 3 | 5 |  |
|  | 4 | 3 | + |  | 5 | 7 | + |
|  | 7 | 8 |  |  | 9 | 2 |  |

In Year 2 pupils are introduced to formal methods of addition, starting with jumps on the number line and the using columns to add together two numbers.

## Subtraction

I can subtract two two digit numbers.

| 9 | 4 | - | 5 | 7 | $=$ | 3 | 7 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |  |  |  |
|  |  | -50 |  |  | -7 |  |  |
| 94 |  |  |  | 44 |  |  | 37 |
|  |  |  |  |  | 8 |  |  |
|  | 8 | 5 |  |  | 2 | 10 |  |
|  | 4 | 3 | - |  | 5 | 7 | - |
|  | 4 | 2 |  |  | 3 | 3 |  |

In Year 2 pupils are introduced to formal methods of subtraction. On the number line we start with the larger number and jump back. We also teach decomposition (borrowing)

## Leconfield calculation policy Year 2

## Multiplication

I can use and recall multiplication facts for the 2,5 and 10 times tables.
$x \times \times \times \times$
$x \times \times \times \times$
$x \times \times \times x$
$\times \times \times \times \times$
The array helps pupils to show the commutativity of the multiplication facts.

5 groups of 4
$5 \times 4=20$
4 groups of 5
$4 \times 5=20$
Chidlren can also use repeated addition to show multiplication.


In Year 2 we also begin our 3 and 4 times tables too.

## Division

I can solve division problems, including involving problems in context.

Division as sharing.
A farmer has 50 sheep, he wants to put them into 5 pens. How many sheep will be in each pen?
$50 \div 5=10$ Pupils use their multiplication facts to help to solve these problems.

Division as grouping.
There are 15 sheep in a field, they need to be in groups of 5 , how many groups would we


## Addition

I can add numbers with up to three digits, using formal written methods of columnar addition.

|  |  |  |  | 1 | 1 |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 2 | 3 | 6 |  | 5 | 6 | 9 |  |
| 4 | 2 | 3 | + | 2 | 8 | 6 | + |
| 6 | 5 | 9 |  | 8 | 5 | 5 |  |

In Year 3 children continue to build on their knowledge and understanding of column addition.
Children understand the methods of carrying and know the value of each of the columns. Hundreds, tens and ones.
Children become efficient with these methods and confident in their explanations.

## Subtraction

I can subtract numbers with up to three digits, using formal written methods of columnar subtraction.

|  |  |  |  | 7 | 9 |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 7 | 9 | 5 |  | 8 | 10 | 13 |  |
| 4 | 2 | 3 | - | 2 | 8 | 6 | - |
| 3 | 7 | 2 |  | 5 | 1 | 7 |  |

In Year 3 pupils continue to build on their knowledge and understanding of column subtraction.
Children understand the methods of
borrowing (decomposition) and understand each column is made up: ten tens $=$ one hundred.
Children become efficient with these methods and confident in their explanations

## Leconfield calculation policy Year 3

## Multiplication

I can multiply two-digit numbers by one-digit numbers, using mental and progressing to formal written methods

| 67 | $x$ | 3 | $=$ | 2 | 0 | 1 |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 60 | 7 |  |  |  |  |  |
| 3 | 180 | 21 |  |  | 6 | 7 |  |
| 1 |  |  |  |  |  | 3 | $x$ |
| 1 | 8 | 0 |  | 1 | 8 | 0 |  |
|  | 2 | 1 | + |  | 2 | 1 |  |
| 2 | 0 | 1 |  | 2 | 0 | 1 |  |

In Year 3 children begin by using the grid method and then progress, applying these principles to the short multiplication method.

## Division

I can divide two-digit numbers by onedigit numbers, using mental and progressing to formal written methods

| 86 | $\div$ | 2 | $=$ | 43 |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 81 | $\div$ | 3 | $=$ | 21 |
|  | 4 | 3 |  |  | 2 | 7 |  |
| 2 | 8 | 6 |  | 3 | 8 | 21 |  |

In Year 3 children begin to explore more formal methods of division.
We ask: How many times does 2 go into 8? How many times does 2 go into 6?
In order to complete this pupils must understand the place value of each of the numbers. For example the 8 represents the 80 in the first question.

## Addition

I can add numbers with up to 4 digits using written methods

| 1 | 1 |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 4 | 5 | 6 | 2 |  |
| 3 | 8 | 9 | 6 | + |
| 8 | 4 | 5 | 8 |  |


|  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  | 7 |  | 3 |  |
| 2 |  | 9 |  | + |
| 8 | 2 | 4 | 7 |  |

Children are confident with adding together 4 digit numbers using carrying.

Children then use these skills to help them find missing numbers for addition.

## Subtraction

I can subtract numbers with up to 4 digits using written methods.

| 8 | 9 | 9 |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 2 | $1 Q$ | $1 Q$ | 13 |  |
| 2 | 4 | 7 | 6 | + |
| 6 | 5 | 2 | 7 |  |

Children are confident with subtracting numbers using decomposition.

|  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
| 6 | 7 | 4 | 3 |  |
|  |  |  |  | + |
| 2 | 5 | 7 | 1 |  |

Children then use these skills to help them find missing numbers to solve subtraction problems. Pupils might use the inverse.

## Leconfield calculation policy Year 4

## Multiplication

I can multiply a 3 digit number by a one digit number.

|  | 3 | 7 | 4 |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  | 6 | $x$ |
| 1 | 8 | 0 | 0 |  |
|  | 4 | 2 | 0 |  |
|  |  | 2 | 4 | + |
| 2 | 2 | 4 | 4 |  |

$374 \times 6=2244$
$(300 \times 6=1800)$
$(70 \times 6=420)$
$(4 \times 6=24)$

By Year 4 pupils should be fluent in their times tables up to $12 \times 12$.
This then aids pupils with their multiplication skills and enables them to multiply numbers with 3 digit by 2 digits.

## Division

I can divide 2 and 3 digit numbers by single numbers using known facts.

| 544 | $\div$ | 4 | $=$ | 126 |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |
|  | 1 | 3 | 6 |  |
| 4 | 5 | 14 | 24 |  |
|  |  |  |  |  |
| 253 | $\div$ | 9 | $=$ | $28 r 1$ |
|  |  |  |  |  |
|  | 0 | 2 | 8 | $r 1$ |
| 9 | 2 | 25 | 73 |  |

Pupils to continue to develop their division skills with up to 3 digits.

Pupils also explore remainders and understand that there

## Addition

I can add numbers with more than 4 digits using formal methods

| 1 | 1 | 1 |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- |
| 6 | 4 | 5 | 6 | 2 |  |
| 2 | 9 | 8 | 9 | 6 | + |
| 9 | 4 | 4 | 5 | 8 |  |


| 2 | + | 2 | $=$ | 16 |
| :---: | :---: | :---: | :---: | :---: |
| 5 |  | 3 |  | 15 |
| $x 3$ |  | $x 5$ |  |  |
| 6 | + | 10 | $=$ | 16 |
| $\frac{15}{15}$ |  |  | 15 |  |

Children continue to use the column methods to add numbers.

Children begin to add fractions. They find a common denominator to help add the fractions correctly.

## Subtraction

I can subtract numbers with more than 4 digits using formal methods

|  | 7 | 15 | 9 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 7 | 8 | 6 | 10 | 13 |  |
| 3 | 6 | 9 | 2 | 8 | - |
| 4 | 1 | 6 | 7 | 5 |  |

Children continue to use the column methods to subtract numbers.

| 4 | - | 1 | $=$ | 7 |
| :---: | :---: | :---: | :---: | :---: |
| 5 |  | 3 |  | 15 |
| $x 3$ |  | $x 5$ |  |  |
| 12 | - | 5 | $=$ | 7 |
| 15 |  | 15 |  | 15 |

Children begin to subtract fractions. They find a common denominator to help subtract the fractions correctly.

# Leconfield calculation policy Year 5 

## Multiplication

I can multiply numbers with up to 4 digits by 2 digit numbers

|  |  | 3 | 4 | 2 | 7 |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
|  |  |  |  | 4 | 6 | $x$ |
| 1 | 3 | 8 | 0 | 0 | 0 |  |
|  | 1 | 8 | 4 | 0 | 0 |  |
|  |  |  | 9 | 2 | 0 | + |
|  | 1 | 1 | 3 | 2 | 2 |  |
| 1 | 5 | 7 | 6 | 4 | 2 |  |

$(3000 \times 46)$
$(400 \times 46)$
$(20 \times 46)$
$7 \times 46$ )

Children will use their fluency of the number facts to help with the multiplication of the larger numbers.

## Division

I can divide numbers with up to 4 digits by one digit numbers

| 4554 | $\div$ | 6 | $=$ | 759 |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |
|  | 0 | 7 | 5 | 9 |
| 6 | 4 | 45 | 35 | 54 |

Children continue to build on their division skills, using their knowledge of the times tables facts to assist with this.

Prime Numbers:
They also begin to explore prime numbers, those numbers divisible only by themselves and one:

$$
1,3,5,7,9,11,13,17,19,23 \ldots
$$

## Addition

I can solve addition multi-step problems.
Arithmetic:

| 4 | + | 2 | $=1$ | 1 |
| :---: | :---: | :---: | :---: | :---: |
| 9 |  | 3 |  | 9 |
| 4 | + | 6 | $=$ | 10 |
| 9 |  | 9 |  | 9 |

When adding fractions the denominator must be the same.
(Common denominator)

## Reasoning:

This sign shows the number of empty spaces on
This sign shows the number of en
each level of a car park at 10 am .

Empty Spaces
Level 2511 Level 1268

These reasoning problems ask children to use both their addition and subtraction skills.

## Subtraction

I can solve subtraction multi step problems.
Arithmetic: 26-2.102

|  | 5 | 9 | 9 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 2 | 6 | $1 Q$ | 10 | 10 | - |
|  | 2 | $\bullet$ | 1 | 0 | 2 |
| 2 | 3 | $\bullet$ | 8 | 9 | 8 |

Children have to apply their knowledge to decimals.

Adam has a bag of fruit that weighs $\mathbf{1 . 2 5}$ kilograms.
Reasoning: Children apply their subtraction skills to solve problems like this.

He takes out a banana. Now the bag of fruit weighs $\mathbf{1 . 1} \mathbf{~ k g}$.
Next, he takes out an orange. Now the bag weighs 920 g .

# Leconfield calculation policy Year 6 

