



LONGFIELD PRIMARY SCHOOL (LPS) POLICY FOR MATHEMATICS

The Rule of Law

- Pupils are taught the importance of laws and rules applicable to class, school and the wider community.
- Pupils are taught the value and reasons behind rules and laws; that they are there to govern and protect and that there are consequences when ignored or broken.
- Teaching is reinforced by the school motto, 5Rs and the School Behaviour thermometer.
- We use visits from partner agencies such as police to support and reinforce learning.
- We ensure that expectations are reinforced regularly and we praise positive choices.

Outcome: Pupils display excellent behaviour and demonstrate fairness in sport.

Individual Liberty

- Pupils are actively encouraged to make choices in a safe and supportive environment.
- Pupils make informed choices regarding their education and behaviour
- They are given the freedom to make choices and become critical thinkers
- Pupils identify the benefits in evaluating, reflecting and collecting valid and reliable evidence on which to base choices
- PSHCE/e-Safety lessons equip pupils with the skills to make safe choices and empower them to know their rights

Outcome: Pupils display responsibility and independence

Tolerance of those of Different Faiths and Beliefs

- Longfield Primary is an extremely diverse school
- We actively promote diversity through our celebrations of different faiths and cultures
- Religious Education and PSHE lessons reinforce messages of tolerance and respect for others
- Members of different faiths and religions are encouraged to share their knowledge
- Pupils visit places of worship that are important to different faiths
- We promote messages of equality

Outcome: pupils display tolerance, knowledge and understanding of different faiths, races and cultures

Mutual Respect

- Pupils are taught core values such as 'Show respect' and 'Working together to achieve'
- They demonstrate responsibility for self and others
- Our school reward system is centred on our four school houses: Livingstone, Jubilee, St. George and Sunflower
- Rewards are given for positive attitudes and behaviours: courtesy slips, house points and good walking tokens
- High levels of mutual respect are developed through relationships between staff and pupils

Outcome: Pupils display mature learning behaviour and excellent relationships with peers and adults

Date Written: Dec 2018

Review Date: Dec 2020

Date Ratified:

Signature: _____ (Chair of LPS Governing Body)

LONGFIELD PRIMARY SCHOOL CURRICULUM POLICY FOR MATHEMATICS

*'Being a successful learner in mathematics involves constructing understanding through exploration, problem solving, discussion and practical experience'
(Derek Haylock 2014)*

1. INTRODUCTION

- 1.1 Mathematics is a core curriculum subject within the National Curriculum. This document outlines the purpose, nature and management of the subject in the school.
- 1.2 The implementation of the policy is the responsibility of all members of the teaching staff.

2. THE NATURE OF MATHEMATICS

- 2.1 Mathematics is an essential part of our everyday lives. This is reflected in school when the use of mathematics skills, knowledge and language is required in other areas of the curriculum. Pupils are encouraged to use mathematics in practical activities, to solve problems and to explore patterns and relationships on which mathematical concepts depend.
- 2.2 Numeracy is a proficiency which involves confidence and competence with numbers and measures. It requires an understanding of the number system, a range of computational skills and an inclination and ability to solve number problems in a variety of contexts. Numeracy demands practical understanding of measurement and graphs, diagrams, charts and tables. At the heart of Numeracy is the ability to calculate mentally.
- 2.3 The aim is that pupils should develop a positive attitude towards mathematics and become confident and competent in the subject through a curriculum which is broad, balanced, relevant and differentiated. Mathematics should be used to analyse and communicate a wide variety of information.

3 ENTITLEMENT

3.1

The National Curriculum for Mathematics sets out how mathematics can be planned and taught. It covers Key Stages 1 and 2 and the Programmes of Study are organised into the following domains:

Number
Measurement
Geometry
Statistics (from Year 3)
Ratio and Proportion (in Year 6)

Algebra (in Year 6)

In Nursery and Reception, The Early Years Foundation Stage Area for Learning Development is followed, for Number and Shape, Space and Measures. (See EYFS policy).

- 3.2 The learning objectives will be shared and addressed.
- 3.3 Key mathematical vocabulary will be corrected, modelled and promoted, and pupils will be expected to use increasingly mathematical language.

4. IMPLEMENTATION

- 4.1 The approach to teaching is based on the following key principles:
 - i) dedicated daily mathematics lessons for Key Stages 1 and 2. In the Foundation Stage, it is taught throughout each week using a cross-curricular topic link
 - ii) a balance of direct and interactive teaching and interactive with the whole class and groups
 - iii) an emphasis on mental calculation as well as using and applying mathematics in order to develop mathematical fluency and reasoning
 - iv) planned opportunities for 'Talk for Maths', including stimulating and tactile resources and open-ended investigations to promote collaboration and discussion about the learning taking place
 - v) controlled differentiation on a common theme using assessment of learning to inform next steps for pupils.
- 4.2 Each daily lesson lasts between 40- 50 minutes, in addition to a 10 minute mental maths session each day.
- 4.3 The focus on direct teaching means pupils are taught through a range of approaches:
 - directing
 - instructing
 - demonstrating
 - explaining and illustrating
 - questioning and discussing
 - consolidating
 - evaluating pupil response
 - summarising

- 4.4 A typical lesson could follow this structure:
- oral and mental calculation to rehearse, sharpen and develop mental and oral skills
 - a 'hook' to engage pupil interest and align the taught skills with a practical context to promote reasoning
 - the main teaching activity, during which mini plenaries may be used to assess understanding and address misconceptions
 - opportunities for pupils to explore and apply the skills being taught
 - planned time for pupils to share and assess their own progress at the end of the lesson
- 4.5 Pupils are given opportunities to work in a range of social contexts. They develop skills to work as individuals, collaboratively with a partner, as part of a small group and as a whole class.
- 4.6 Pupil groups:
- 4.6.1 Pupils are taught in their class groups in Reception and Year 1. In Years 2, 3, 4, 5 and 6 pupils are taught in ability sets at least twice a week. All pupils will be taught in a mixed ability Maths set for at least one lesson each week.
- 4.6.2 Pupils are selected for sets by standardised and non-standardised tests, and by teacher assessment.
- 4.7 Pupils are given the opportunity to present and display their work in a variety of ways. Classroom displays include mathematical presentations and mathematics vocabulary.
- 4.8 Mathematical skills are used where appropriate across the curriculum and mathematical experience is drawn out of a range of activities to promote fluency.
- 4.9 Pupils are given opportunities to use ICT skills to apply and use their mathematics. They will use a range of software to develop their understanding.
- 4.10 Calculators are used to enable pupils to investigate number patterns and to concentrate upon the methods of working in problem solving. Pupils will be encouraged to recognise when it is, and is not, appropriate to use a calculator.
- 4.11 Pupils use a combination of teacher prepared materials including ICT and intervention programmes. In order to encourage mathematical investigation and to assist assessment, there are number of photocopiable books and materials, mathematics programmes and lists of websites.

4.12 A supply of frequently used mathematics equipment is available in each classroom, and pupils are encouraged to use this as and when required.

4.13 KS1 and KS2 intervention resource kits are available to all teaching and support staff leading pupil interventions, to support pupils in developing fluency and reasoning in Mathematics. These resources are organised and updated by the Maths subject leader.

4.13.1 Reference books for mathematics are available throughout the school for staff and children. There are a number of CD Roms and programmes available on the 'Public' area of the server and on DB Primary.

4.13.2 All teaching staff have access to the Calculation policy (see Appendix) in which age appropriate methods for the teaching of addition, subtraction, division and multiplication are broken down within each year group.

4.14 Links with Home:

4.15 Out of class activities or homework are set for children to practise and consolidate their skills and knowledge, develop and extend their techniques and strategies, and to prepare for future learning. Activities are available on DB Primary and Mathletics.

4.15.1 Pupils take home mathematical tasks at least once a week. Parents, carers and other people at home are encouraged to support the completion of homework and to show an interest in the pupils' mathematics learning in school.

4.15.2 Pupils are encouraged to practise mental mathematics skills, including learning number facts and multiplication tables.

5. ASSESSMENT

5.1 Manageable assessment, recording and reporting are important elements of teaching. Assessment will be made against each pupil's grasp of the learning objectives.

5.2 All KS1 and KS2 pupils take a standardised test at the end of each term to monitor their progress. EYFS teachers use pupil observations to inform baseline and termly assessments.

5.3 Teachers make regular assessments of pupil progress. Copies of tests and other assessment tasks are kept in the filing system in the Reprographics room.

- 5.4 Teachers record the most suitable level description for each pupil in each learning objective of mathematics. This information is equated to Learning Ladder point scores and recorded on SIMS.
- 5.5 Each year group has a target percentage of children to reach appropriate objectives, outlined in annual teacher Performance Management targets.
- 5.6 It is the responsibility of the Maths Subject Leader to monitor and review the progress of under-achieving groups in Maths and to organise interventions to ensure the support of under-achieving pupils.
- 5.7 Specific short term targets relating to the National Curriculum Learning Objectives are set and shared with the pupils regularly, using the Learning Ladders criteria.
- 5.8 Both teaching and learning will be monitored by the Maths Subject Leader and members of the Senior Leadership Team when appropriate. This will be done through observing lessons, planning and pupils' books; and through discussions with both staff and pupils.

6. EQUAL OPPORTUNITIES

See Equal Opportunities Policy

7. BACKGROUND INFORMATION

- 7.1 This policy was compiled with reference to the National Curriculum for Mathematics.

8. REVIEW

Date of Policy: December 2018
Date of Next Review: December 2020

Appendix

LONGFIELD PRIMARY SCHOOL



Calculation Policy

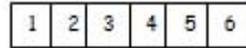
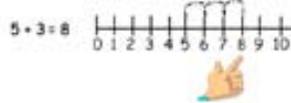
Date Written: May 2015

Date Ratified: _____ Signature: _____

Date of Review: December 2018

EYFS - Addition

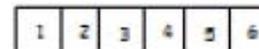
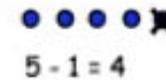
Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

GUIDANCE / MODELS AND IMAGES	KEY VOCABULARY
<p>If available, Numicon shapes are introduced straight away and can be used to:</p> <ul style="list-style-type: none"> • identify 1 more/less • combine pieces to add. • find number bonds. • add without counting. <p>Children can record this by printing or drawing around Numicon pieces.</p> <p>Children begin to combine groups of objects using concrete apparatus</p>  <p>Construct number sentences verbally or using cards to go with practical activities.</p> <p>Children are encouraged to read number sentences aloud in different ways "Three add two equals 5" "5 is equal to three and two"</p> <p>Children make a record in pictures, words or symbols of addition activities already carried out.</p> <p>Solve simple problems using fingers</p>  $5 + 1 = 6$ <p>Number tracks can be introduced to count up on and to find one more:</p>  <p>What is 1 more than 4? 1 more than 13?</p> <p>Number lines can then be used alongside number tracks and practical apparatus to solve addition calculations and word problems.</p>  <p>Children will need opportunities to look at and talk about different models and images as they move between representations.</p>	<p>Games and songs can be a useful way to begin using vocabulary involved in addition e.g. Alice the Camel</p> <p>add</p> <p>more</p> <p>and</p> <p>make</p> <p>sum</p> <p>total</p> <p>altogether</p> <p>score</p> <p>double</p> <p>one more, two more, ten more...</p> <p>how many more to make...?</p> <p>how many more is... than...?</p>

EYFS - Subtraction

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

GUIDANCE / MODELS AND IMAGES	KEY VOCABULARY
<p>Children begin with mostly pictorial representations</p> <p>XXX XX</p> <p>Concrete apparatus is used to relate subtraction to taking away and counting how many objects are left.</p> <p>Concrete apparatus models the subtraction of 2 objects from a set of 5.</p> <p>Construct number sentences verbally or using cards to go with practical activities.</p> <p>Children are encouraged to read number sentences aloud in different ways "five subtract one leaves four" "four is equal to five subtract one"</p> <p>Children make a record in pictures, words or symbols of subtraction activities already carried out.</p> <p>Solve simple problems using fingers</p> <p>Number tracks can be introduced to count back and to find one less:</p> <p>What is 1 less than 9? 1 less than 20?</p> <p>Number lines can then be used alongside number tracks and practical apparatus to solve subtraction calculations and word problems. Children count back under the number line.</p> <p>Children will need opportunities to look at and talk about different models and images as they move between representations.</p>	<p>Games and songs can be a useful way to begin using vocabulary involved in subtraction e.g. Five little men in a flying saucer</p> <p>take (away)</p> <p>leave</p> <p>how many are left/left over?</p> <p>how many have gone?</p> <p>one less, two less... ten less...</p> <p>how many fewer is... than...?</p> <p>difference between</p> <p>is the same as</p>



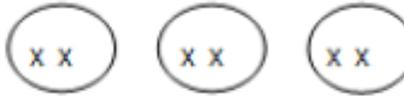
EYFS - Multiplication

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

GUIDANCE / MODELS AND IMAGES	KEY VOCABULARY
<p>The link between addition and multiplication can be introduced through doubling.</p> <p>If available, Numicon is used to visualise the repeated adding of the same number. These can then be drawn around or printed as a way of recording.</p> <p>Children begin with mostly pictorial representations:</p>  <p>How many groups of 2 are there?</p> <p>Real life contexts and use of practical equipment to <u>count in repeated groups of the same size</u>:</p>  <p>How many wheels are there altogether?</p>  <p>How much money do I have?</p>  <p>Count in twos; fives; tens both aloud and with objects</p> <p>Children are <u>given multiplication problems set in a real life context</u>. Children are encouraged to visualise the problem.</p> <p>How many fingers on two hands? How many sides on three triangles? How many legs on four ducks?</p> <p>Children are encouraged to read number sentences aloud in different ways "five times two makes ten" "ten is equal to five multiplied by two"</p>	<p>lots of</p> <p>groups of</p> <p>times</p> <p>multiply</p> <p>multiplied by</p> <p>multiple of</p> <p>once, twice, three</p> <p>times... ten times...</p> <p>...times as (big, long, wide... and so on)</p> <p>repeated addition</p> <p>double</p>

EYFS - Division and fractions

Maths for young children should be meaningful. Where possible, concepts should be taught in the context of real life.

GUIDANCE / MODELS AND IMAGES	KEY VOCABULARY
<p>The ELG states that children solve problems, including doubling, halving and sharing.</p> <p>Children need to see and hear representations of division as both grouping and sharing.</p> <p>Division can be introduced through halving.</p> <p>Children begin with mostly pictorial representations linked to real life contexts:</p> <div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;">  <p>Grouping model Mum has 6 socks. She grouped them into pairs – how many pairs did she make?</p> </div> <div>  <p>Sharing model I have 10 sweets. I want to share them with my friend. How many will we have each?</p> </div> </div> <p>Children have a go at recording the calculation that has been carried out.</p>	<p>halve</p> <p>share, share equally</p> <p>one each, two each, three each...</p> <p>group in pairs, threes...</p> <p>tens</p> <p>equal groups of</p> <p>divide</p> <p>divided by</p> <p>divided into</p> <p>left, left over</p>

FRACTIONS

GUIDANCE / MODELS AND IMAGES	KEY VOCABULARY
<p>Although not explicit in the Development Matters document, the sharing model is a useful way of introducing young children to fractions and calculating with fractions.</p> <p>Setting the problems in real life context and solving them with <u>concrete apparatus</u> will support children's understanding.</p> <p>"I have got 5 bones to share between my two dogs. How many bones will they get each?"</p> <div style="display: flex; align-items: center; justify-content: center; margin: 10px 0;">   </div> <div style="display: flex; align-items: center; justify-content: center; margin: 10px 0;">   </div> <p>Children have a go at recording the calculation that has been carried out.</p> $2\frac{1}{2} + 2\frac{1}{2} = 5$	<p>As division vocabulary plus:</p> <p>fraction</p> <p>half</p> <p>halves</p> <p>third</p> <p>thirds</p>

Addition - Year 1

+ = signs and missing numbers

Children need to understand the concept of equality before using the '=' sign. Calculations should be written either side of the equality sign so that the sign is not just interpreted as 'the answer'.

$$2 = 1 + 1$$

$$2 + 3 = 4 + 1$$

Missing numbers need to be placed in all possible places.

$$3 + 4 = \square \square = 3 + 4$$

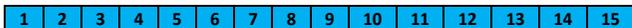
$$3 + \square = 7 \quad 7 = \square + 4$$

Counting and Combining sets of Objects

Combining two sets of objects (aggregation) which will progress onto adding on to a set (augmentation)

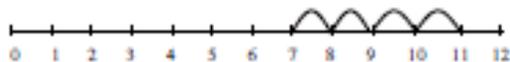


Understanding of counting on with a numbertrack.



Understanding of counting on with a numberline (supported by models and images).

$$7 + 4$$



Addition – Year 2

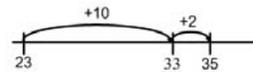
Missing number problems e.g. $14 + 5 = 10 + \square$ $32 + \square + \square = 100$
 $35 = 1 + \square + 5$

It is valuable to use a range of representations (also see Y1). Continue to use numberlines to develop understanding of:

$$23 + 12 = 23 + 10 + 2$$

$$= 33 + 2$$

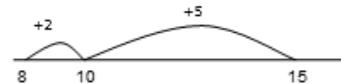
$$= 35$$



Partitioning and bridging through 10

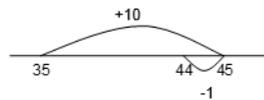
The steps in addition often bridge through a multiple of 10 e.g. children should be able to partition the 7 to relate adding the 2 and then the 5.

$$8 + 7 = 15$$



Adding 9 or 11 by adding 10 and adjusting by 1

e.g. Add 9 by adding 10 and adjusting by 1
 $35 + 9 = 44$



Towards a Written Method

Partitioning in different way and recombine

$$47 + 25$$

$$47 + 25 = 60 + 12$$

Leading to exchanging
72

Addition – Year 3

Missing number problems using a range of equations as in Year 1 and 2 but with appropriate larger numbers.

Partition into tens and ones

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.

Towards a Written Method

Introduce expanded column addition modelled with place value counters (Dienes could be used for those who need a less abstract representation).

			$200 + 40 + 7$
			<u>$100 + 20 + 5$</u>
			$300 + 60 + 12 = 372$
			247
			<u>$+ 125$</u>
			12
			60
			<u>300</u>
			372

Leading to children understanding the exchange between tens and ones.

			247
			<u>$+ 125$</u>
			372
			10

Some children may begin to use a columnar algorithm, initially

247	formal
<u>$+ 125$</u>	introduced
372	
10	

