

# Longford Park Primary School

## Policy Document

### Maths



#### The Importance of Maths

Maths is a creative and highly inter-connected discipline that has been developed over centuries, providing the solutions to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary in most forms of employment. A high-quality Maths education therefore provides a foundation for understanding the world, the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject.

#### Rationale

This policy is written to:

- Provide a consistent approach to learning and teaching of Maths across the whole school
- Instil teachers with confidence when planning and delivering Maths lessons
- Provide a consistent approach to long, medium and short term planning that allows teachers to use professional judgment to teach to the children's needs
- Ensure pupils are assessed accurately and consistently across the school
- Ensure the correct balance of learning and teaching time for number, geometry, measure and data handling in all year groups
- Clarify key messages about the classroom environment, displays and working walls.

#### Aims

Our school curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

#### Ethos

As a school we want to promote enjoyment and enthusiasm for learning through practical activity, exploration and discussion providing Maths lessons that pupils look forward to, in which they can maximise their potential.

As a school we believe that children from all backgrounds can succeed in Maths. Our focus is on raising standards - working together to show what pupils are capable of and to find

effective ways to enable every child to succeed. We do not believe that Maths should be used to identify those who appear to be naturally more or less able, but rather that all children have the potential to become 'able' mathematicians.

We aim for children to study fewer areas of learning in each term and in each year but develop a greater understanding of each. This will help teachers to focus on quality teaching and not be hindered by a curriculum based on coverage of topics.

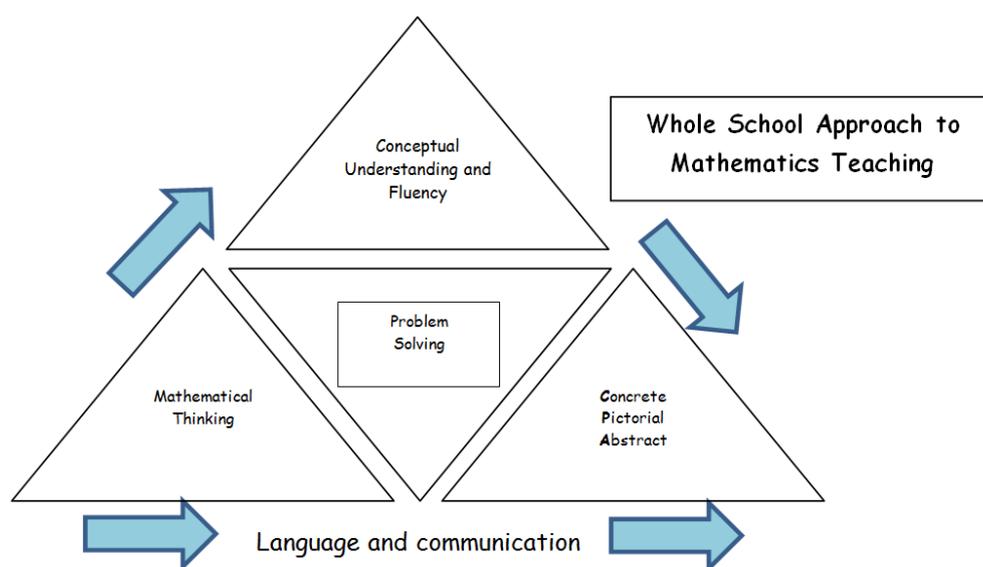
Three key features of our maths teaching include:

- High expectations for every child
- More time on fewer topics
- Problem-solving at the heart

We aim to embed a deep understanding of maths by employing a **concrete, pictorial, abstract** approach - using objects and pictures before numbers and symbols so that pupils understand what they are doing rather than just learning to repeat routines without grasping what is happening.

**We emphasise:**

- **Language** - communicating ideas, proof, clarity and development of mathematical concepts.
- **Thinking** - questioning and task design to promote mathematical thinking.
- **Understanding** - using a concrete, pictorial and abstract approach to deepen conceptual understanding, and making connections to previous learning, to other subjects and to the 'real world'.
- **Problem Solving** - to be mathematical is to solve mathematical problems. Problem solving is both why and how we learn mathematics.



## 2. Approach to Maths Teaching

### CPA – Concrete Pictorial Abstract

We aim to embed a deep understanding of maths by employing a *concrete, pictorial, abstract* approach - using objects and pictures before numbers and symbols so that pupils understand what they are doing rather than just learning to repeat routines without grasping what is happening. This is the same approach used in Singapore maths.

The concrete-pictorial-abstract approach, based on research by psychologist Jerome Bruner, he suggests that there are three steps (or representations) necessary for pupils to develop understanding of a concept. Reinforcement is achieved by going back and forth between these representations.

#### **Concrete representation**

**The active stage** - a child is first introduced to an idea or a skill by acting it out with real objects. In division, for example, this might be done by separating apples into groups of red ones and green ones or by sharing 12 biscuits amongst 6 children. This is a 'hands on' component using real objects and it is the foundation for conceptual understanding.

#### **Pictorial representation**

**The iconic stage** - a child has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem. In the case of a division exercise this could be the action of circling objects.

Using diagrams and images to represent numbers and symbols.

Here, children move away from physical, hands on objects and instead use pictures for demonstrations and also recording.

#### **Abstract representation**

**The symbolic stage** - Progressing to the use of numbers and symbols in a conventional written method: a child is now capable of representing problems by using mathematical notation, for example:

$12 \div 2 = 6$  (This is the ultimate mode, for it is clearly the most mysterious of the three).

### Numicon and Core Resources

We use Numicon as a core resource in Early Years and KS1, and for children who need further support with conceptual understanding in KS2. Early on it is important that children don't rely solely on Numicon and that a wide range of concrete resources are used to help children with conceptual understanding. Older children who need further support with conceptual understanding will be supported through a range of concrete objects including counting dienes and colour coded place value counters.



### Bar Modelling

The bar model helps children visualise the relationships between the numbers given and the amount you are looking for in a word problem. What's great about this tool is that the model

starts in elementary school with addition and subtraction problems and then can be expanded to work with multiplication and division problems, fractions, ratios, and percentages. This model is incredibly useful when you need to make sense of the given information and figure out how to solve a complex problem. Using this model needs to be taught from early years onwards to ensure children can use it more independently as they progress through school.

### 3. Planning and Organisation

All planning is to be organised and accessible on the school network as agreed.

Each year group has a curriculum map that is designed to ensure statutory coverage and clear lines of progression. The map should outline the topics within the strands that will be taught from Y1 to Y6 and should be constructed to show clear progression through the number system.

Assessment weeks and special events will not feature on the long term plan but will be timetabled separately. The long term plan should provide a guide to the appropriate time allocated to the different areas of maths and should not be stuck to rigidly. Teachers should use their professional judgement and on-going assessments to inform and adapt their planning as and when appropriate.

The Maths curriculum is designed to ensure statutory coverage and progress through the number system. The programmes of study are mapped out to ensure that all the necessary number and place value work is covered in the autumn term and that topics within Maths are taught in the correct order ensuring the children can access the measurement, statistics and shape work later in the school year. The aim of the Term 1 curriculum is to ensure that teachers and children develop confidence in key areas of Maths. Place value, number operations and fractions are generally revisited in the second half of the term. The summer term allows opportunities to revisit topics and consolidate learning. The Maths curriculum is mapped out half termly and provides a guide to teaching through the number system; the medium term planning provides further guidance on how the programmes of study are broken down into staged objectives and should identify which areas can be taught effectively through mental/oral starters.

#### Long Term Planning KS1

Curriculum maps are designed and based on a 34 week school year (taking into account assessment weeks and special events). The plan should be used as a guide to structure your teaching as follows:

Strand	Approximate Teaching Time
Number and Calculation	25 - 28 weeks
Geometry, Shape and Space	2 - 3 weeks
Statistics (year 2 only)	2 - 3 weeks
Measurement	3 - 4 weeks

## Long Term Planning KS2

Strand	Approximate Teaching Time
Number and Calculation	20 - 22 weeks
Geometry, Shape and Space	6 - 7 weeks
Statistics	3 - 4 weeks
Measurement	3 - 4 weeks

## Medium Term Planning

The medium term planning must be completed before the commencement of each half term. The medium term plans should provide an overview of the half term and outline what the pupils will be taught. The Primary National Curriculum for maths 2014 and should contain a manageable amount of detail.

The objectives outlined in the medium term planning should directly inform the short term planning as these are the objectives that the children will be making clear lines of progress through and will be assessed against.

## Short Term Planning

Short term plans should contain information about the following:

- **Mental/oral starter** - A brief description of the activity and what the children are learning
- **The learning objective for each lesson** - The learning objectives should be concise and clearly explain what the children are learning; the objectives should always be derived from the medium term planning in line with the Primary Curriculum for maths 2014.
- **Main teaching activities** - A summary of the activity that provides enough detail for other teachers (teachers who have not been involved in the planning process) to follow successfully.
- **Key vocabulary** - The key mathematical vocabulary for the week should be listed.
- **Success Criteria** - The success criteria should always be linked to children's outcomes. When planning success criteria, it is important to consider: what the pupils have learned (what can they do after the lesson that they couldn't do before); how will the pupils demonstrate that they have met the learning objective(s) and how to make it clear what good quality work looks like (without simply focusing on task completion).
- **Plenary/assessment** - Should give an overview of how the lesson is concluded and what will be assessed, this should not be a detailed description of activities as often mini-plenaries throughout the lesson can impact on learning more effectively.
- **Resources** - Use this space as an aide memoir of the resources you will need to enhance the lesson.
- **Differentiated activities** - All groups now have an agreed colour which features on the planning pro-forma. The coloured cell should also give the level that the activity is pitched at. This section should contain a brief summary of the task or learning activity.

**When planning, not all lessons should be one hour and sometimes shorter or longer lessons are appropriate depending on the learning objective and the content of the lesson.**

## **Maths Planning and organisation in Early Years**

EYFS Maths is related to the objectives set out in the Early Learning Goals, which underpin the curriculum planning for children aged three to five. We provide a play based curriculum to give all the children ample opportunity to develop their understanding of number, measurement, pattern, shape and space, through varied activities that allow them to enjoy, explore, practise and talk confidently about mathematics. Children in Year 1 access the national Curriculum as appropriate to their ability.

### **4. Assessment and Tracking**

From Y1 - Y6 children will be formally assessed on a termly basis using Arithmetic and Reasoning papers from Cornerstones and will be used alongside ongoing teacher assessments to make an informed Age Related status.

The Maths tests are designed and based on end of KS1 and end of KS2 assessments.

#### **Target setting**

Each child is set individual targets, as appropriate, and progress towards them is regularly assessed and a new one given.

### **5. Maths and inclusion**

At our school, we teach Maths to all children, whatever their ability and individual needs. Maths forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our Maths teaching, we provide learning opportunities that enable all pupils to make good progress. We strive to meet the needs of those pupils with protected characteristics and we take all reasonable steps to achieve this.

As part of our vision to enable each child to achieve their full potential we run a series of Maths Workshops where every child works with their parent. These workshops show a variety of strategies the school uses in teaching Maths and provides a pack of resources which include carefully designed homework so parents feel confident in supporting their child to achieve.

### **6. Assessment for learning**

Teachers will assess children's work daily to ensure learning and teaching is adjusted for the needs of the children in line with the school's marking policy.

Moderation Grids, from Cornerstones, form the basis of periodic assessment. We collect regular formative assessments as evidence in many forms for a periodic review of the child's attainment and progress. This means that children's progress is continually and accurately being reviewed against National Curriculum expectations across all the attainment targets.

As part of the monitoring process, children who are underachieving against national expectations are highlighted on a termly basis. These children form a target group in each class which is supported by the teaching assistant or teacher, so they may reach the required standard. One to one or small group tuition is provided for some children in Key Stage Two. In years 3-6, they children who are working significantly below their age-related expectation are grouped and taught by a specialised SEND lead and the work is planned by the subject lead.

## **7. Monitoring and Review**

The quality of learning and teaching in Maths is monitored and evaluated by SLT and Governors as part of the school's agreed cycle of lesson observations, book scrutiny, planning trawls, pupil voice and learning walks.

**Reviewed by: JG 2015**

**Date approved by Governors:**

**Date to be reviewed:**