



## Leopold Primary School Maths Intent

### We are Leopold Mathematicians

We believe that every child can master an understanding and love of Maths with the right kind of teaching and support.

### Mathematics statement of intent

We want our children to be ready to take on the world of mathematics by the time they leave Leopold. Through our well thought-out scheme of work we plan for our pupils to be confident mathematicians who have achieved fluency in all aspects of the curriculum. We have the highest expectations for every learner; we want our pupils to master Maths rather than having only surface knowledge and skills in this subject and this is why we have chosen the Maths no Problem scheme of work.

At Leopold we use the following definition of mastery:

*A mathematical concept or skill has been mastered when, through exploration, clarification, practice and application over time a student can represent it in multiple ways. Mastery means that pupils can think mathematically with the concept so that they can independently apply it to a totally new problem in an unfamiliar situation.*

Our teachers find out where pupils truly are on their Maths journey and then ensure that everyone is 'scooped up' in a lesson and also challenged. At the core of our curriculum is the CONCRETE, PICTORIAL AND ABSTRACT approach to Maths.

**Concrete** - children have the opportunity to use concrete objects to help them understand and explain what they are doing.

**Pictorial** - children then build on this concrete approach by using pictorial representations, which can then be used to reason and solve problems.

**Abstract** - With the foundations firmly laid, children can move to an abstract approach using numbers and key concepts with confidence.

As our pupils progress, our intention is for them to be able to understand the world, have the ability to reason mathematically, have an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

Our philosophy is to enable each child to enjoy Mathematics and to appreciate its value in everyday life. We aim to foster a learning environment in which all pupils are provided with experiences that lead to a consistently high level of achievement in Mathematics. We believe that competence with calculations is essential, but that Mathematics is so much more!

### Implementation

#### **Concrete, pictorial, abstract**

Objects, pictures, words, numbers and symbols are everywhere. The mastery approach incorporates all of these to help children explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding. Together, these elements help cement knowledge so pupils truly understand what they've learnt.

All pupils, when introduced to a key new concept, should have the opportunity to build competency in this topic by taking this approach. Pupils are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols.

### **Questioning**

Questioning is a key part of our Maths curriculum and pupils are asked to justify their answers in order to develop their mathematical thinking skills and vocabulary and this is done through journaling.

### **Vocabulary and knowledge organisers**

We have knowledge organisers with key vocabulary listed on them for each main topic and year group. Vocabulary acquisition is a key part of our lessons and is displayed and referred to frequently.

### **Singapore maths**

Many schools in the past have taken part in research project to investigate the impact on learning of following the Singapore method of teaching mathematics. The results demonstrated that their pupils were coming through the school demonstrating an increased grasp of the fundamentals of mathematics. We therefore decided to also follow the Singapore method of teaching in all year groups as it met our children's needs. This approach is based on the premise that every child can master an understanding and love of maths with the right kind of teaching and support. It is a child-centred, problem solving approach that is both fun to learn and fun to teach! The cornerstones of the scheme are: the mastery approach; variation; concrete, pictorial, abstract approach. In years one to six we use Maths No Problem workbooks and textbooks.

### **White Rose**

We use the White Rose scheme of work to teach mathematics in EYFS. This scheme is inspired and informed by robust, world-class research and global Maths experts. Our teachers use this scheme as the foundations upon which to build a solid scheme of work which they can adapt and add to in order to create a scheme bespoke to our pupils' needs.

### **Times tables**

We know that to be fluent at arithmetic our pupils need to master their times tables up to  $12 \times 12$ . We use Times Tables Rock, Times table weekly testing and weekly homework to encourage our children to practise their tables and teach using concrete and pictorial representations to develop a true understanding of times tables. We also hold half-termly times table competition throughout the year.

### **Impact**

The impact of a Mastery approach to mathematics means that our pupils can quickly and easily manipulate numbers and apply their mathematical knowledge to a variety of problems and applications. This is important for our cohort as they join our school with limited learning experiences and with gaps in their learning. Many of our students are EAL and benefit from using our Mastery approach as well as Maths no problem scheme. They have good mental Maths and arithmetic skills and have a solid grasp of the key vocabulary. They are not frightened of numbers and instead relish the challenge and sense of achievement they get from truly mastering mathematics. Our pupils are ready for the next stage of their mathematical journey.

## Teaching & Learning Styles

The school uses a variety of teaching and learning styles in Mathematics lessons. In Years 3-6, Maths No Problem (a scheme) is used to deliver daily lessons.

Our principal aim is to develop children's mathematical fluency, knowledge, skills and reasoning in Mathematics. We do this through a daily lesson that has a high proportion of whole-class teaching. During these lessons, we encourage verbal reasoning and for children to ask as well as answer mathematical questions. They have the opportunity to use a wide range of resources to support their work. Children use technology in Mathematics lessons, through the use of interactive whiteboard and tablets, where it enhances their learning through modelling ideas. Wherever possible, we encourage the children to use and apply their learning in everyday situations. In all classes, there are children of differing mathematical ability. We recognise this fact and provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We use Teaching Assistants to support some children both in and out of the classroom, and ensure that work is matched to the needs of individuals.

## Reception

### A Mastery Approach

Our maths teaching across the school places emphasis upon a mastery approach. This approach seeks to build flexible learners with a depth of understanding that allows them to access a range of problems in a format which they may not have come across before, but which they nevertheless have the skills to solve.

The principles and features that characterise a mastery approach are:

- An expectation that all children are capable of achieving high standards in maths.
- That the large majority of children progress through the curriculum content at the same pace.

## Lesson approach and teaching methods

In order to develop mastery, Maths teaching at Leopold Primary School utilises the CPA (concrete, pictorial and abstract) approach. When introducing new concepts children are given the opportunity to use concrete objects to model problems. This then moves on to children being able to represent these objects pictorially which encourages them to make a mental connection between the physical object and abstract levels of understanding. Finally, children are then able to understand and represent mathematical concepts in an abstract way where symbols are then used to model problems. These three stages however **are not linear**. Teachers will often go back and forth between each representation or model them alongside each other to reinforce concepts.

***Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.***

- Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to foster deep conceptual and procedural knowledge.

- Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts.
- Teachers use precise questioning in class to test conceptual and procedural knowledge, and assess children regularly to identify those requiring intervention so that all children keep up.

## Planning

In order to support the mastery approach to teaching Maths, Leopold Primary School uses the text book 'Maths No Problem' as a starting point for planning in KS1 and KS2. **Planning is adapted according to the needs.** We have progression documents for KS1 and KS2 that teachers use to plan and assess.

Planning is completed using the Leopold Primary School's planning format and includes:

- Details of the lesson reference (textbook, chapter, title and lesson)
- Any follow-up tasks informed from previous lessons or conferencing
- NC learning objective
- Lesson learning outcome
- Key vocabulary
- Anchor (In-Focus) task
- Journaling
- Guided practice
- Independent practice
- Resources

## The Maths No Problem mission statement:

"We believe that every child can master an understanding and love of Maths with the right kind of teaching and support. We want you to join our mission to build the confidence of the nation's Maths teachers and learners." Maths No Problem (2016).

## What is Maths - No Problem?

Maths — No Problem! is a series of textbooks and workbooks written to meet the requirements of the 2014 English National Curriculum. The Maths — No Problem! Primary Series was assessed by the Department for Education's (DfE's) expert panel, which judged that it met the core criteria for a high-quality textbook to support teaching for mastery. As a result, the Maths — No Problem! Primary Series are recommended textbooks for schools on the mastery programme.

## How have the Maths - No Problem! textbooks improved teaching and learning at Leopold?

Our mastery approach to teaching is by no means achieved solely with a textbook. Rigour and skill characterise our teaching and the Maths - No Problem! approach is at the heart of this. So how has this improved our teaching and learning since we introduced the textbooks in October 2018?

The textbooks are skillfully designed by expert authors. They contain carefully varied questions and examples which:

- Are easy for pupils to enter while still containing challenging components
- Encourage pupils to think about Maths
- Deepen pupils' understanding and reveal misconceptions

### Lesson structure

1. Exploration - instead of 'Let me teach you...' as a starting point, children are encouraged to explore a problem themselves to see what they already know. At the beginning of each lesson in our school this exploration is referred to as the 'anchor task'.
2. Structured discussion - the teacher will lead a discussion with the children in order to organise the findings of the exploration, compare/contrast strategies and guide toward the most efficient strategy (or the one being learnt that day).
3. Questions to challenge thinking - teachers use questioning throughout every lesson to check understanding. Children are also encouraged to question each other frequently throughout the lesson; this aids the development of independent learners and deepens their understanding. A variety of questions are used, such as: How do you know? Can you prove it? Are you sure? Is that right? What's the same/different about? Can you explain that? What does your partner think? Can you imagine? Questions are also used to challenge children who have grasped the concept. Children are expected to listen to each other's responses and may be asked to explain someone else's ideas in their own words, or if they agree/disagree etc.
4. Discussion and feedback - pupils have opportunities to talk to their partners and explain/clarify their thinking throughout the lesson, but are expected to complete written work independently (unless working in a guided group with the teacher).

### Recording work

**Anchor (In-focus) task:** As a group/paired learning activity, this can be completed verbally and or on whiteboards.

**Journaling and or guided practice:** This is completed in maths books in pencil/green pen.

**Guided practice:** This is completed in Maths books.

**Independent practice:** Completed in 'Maths No Problem' workbooks

**Photographs of practical activities:** Stuck into children's Maths books and accompanied by a reflection.

### Presentation, marking and feedback

**Presentation** in books must be of a good standard. All work in maths books include the following:

- Date
- LO

**Marking** is completed by children with green pen (self/peer assessment) in line with our marking policy.

- Tick for any correct work
- Dot for any errors and then appropriate corrections to be completed by child using green pen.

### Assessment

Maths assessment for every child will be recorded using statements on 'Target Tracker.' After each week (or fortnight), teachers will update Target Tracker for the objectives covered that week. 75% of the whole class should achieve/be secure on an objective/statement before moving on. Gap analysis of the statements will drive future planning to ensure it is building upon previous learning.