



Leonard Stanley C of E Primary School



Mathematics Rationale

Intent: *Why do we teach this? Why do we teach it in the way we do?*

At Leonard Stanley Primary School we empower our children, through our Values, with a resilient 'CAN DO' attitude. We encourage children to develop their knowledge and understanding of mathematics and aim for all pupils to enjoy and achieve in mathematics and become confident mathematicians.

Our maths curriculum planning promotes our EARLY and DEEP curriculum. We want pupils to have high quality mathematical opportunities, engage in active and experiential learning and take pride in their outcomes. It is ambitious and empowers our children to become independent and resilient. We enrich their time in our school with memorable, unforgettable experiences and provide opportunities which are normally out of reach – this promotes a love of maths that reaches far beyond the classroom.

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject. [National Curriculum 2014]

The national 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.

At Leonard Stanley, we have adopted a mastery approach in order to deliver the three aims of the National Curriculum, fluency, reasoning and problem solving. Underpinning this pedagogy is a belief that all children can achieve in maths. We believe in promoting sustained and deepening understanding by employing a variety of mastery strategies, with teaching for conceptual understanding at the heart of everything we do. We aim to create independent mathematicians who are well equipped to apply their learning to the wider world. Our approach aims to provide all children with full access to the curriculum, enabling them to develop independence, confidence and competence – 'mastery' in mathematics in order to be independent mathematicians who are well equipped to apply their learning to the wider world, rather than many failing to develop the maths skills they need for the future.

Key features of our Maths Mastery curriculum:

- High expectations for every child and equity for all
- Fewer topics, greater depth
- Number sense and place value come first
- Research -based curriculum
- Objects and pictures always before numbers and letters
- Problem solving is central
- Calculate with confidence– understand why it works – constantly curious
- Mathematics Mastery places emphasis on the cumulative mastery of essential knowledge and skills in mathematics. It embeds a deeper understanding of maths by utilising a concrete, pictorial, abstract approach so that pupils understand what they are doing rather than just learning to repeat routines without grasping what is happening.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects. The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems (Deepen It / Dig Deeper activities) before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Implementation: *What do we teach? What does this look like?*

At Leonard Stanley, children study mathematics daily covering a broad and balanced mathematical curriculum including elements of number, calculation, geometry, measures and statistics. Due to the interconnected nature of mathematics, we aim to teach maths in a cross curricular manner as well as discretely to teach the practical application of mathematical skills. We focus not only on the mathematical methods but also focus on mathematical vocabulary and to use Maths Mastery to broaden and deepen mathematical understanding.

Early Years: Preschool and The Reception Year

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in

mathematics, look for patterns and relationships, spot connections, ‘have a go’, talk to adults and peers about what they notice and not be afraid to make mistakes.

As with other learning in Preschool and Early Years, our children will mainly learn about maths through carefully structured and planned continuous provision opportunities both inside the classroom and outdoors, with a focus on **Young Learner’s Interest**. This includes:

- o Using water trays to explore capacity and measures.
- o Use of construction for comparison of size.
- o Using ranges of objects to explore subitising, ordinality and cardinality of numbers

These planned opportunities are linked to other areas of the curriculum. Activities such as these will help children develop important skills such as counting, comparing and ordering. Scientific vocabulary, and **reading opportunities** are well-modelled by adults working with the children. This enables pupils to be **Active Learners** with a focus on **Language Development**.

The following table shows how we use the Development Matters guidance to plan science learning opportunities for children in our Early Years setting, so that they are able to achieve the Early Learning Goals that are linked to Maths:

Development Matters 3 & 4-year-olds will be learning to:	Development Matters Children in Reception will be learning to:	Statutory Framework Early Learning Goals
Recite numbers past 5. Say one number name for each item in order: 1, 2, 3, 4, 5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Fast recognition of up to 3 objects, without having to count them individually ('subitising'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5. Experiment with their own symbols and marks as well as numerals.	Count objects, actions and sounds. Count beyond ten. Link the number symbol (numeral) with its cardinal number value. Subitise (recognising quantities without counting) up to 5. Compare numbers Understand the 'one more than/one less than' relationship between consecutive numbers.	Number • Have a deep understanding of number to 10, including the composition of each number; • Subitise (recognise quantities without counting) up to 5; • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.
Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'. Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides' 'corners'; 'straight', 'flat', 'round'. Understand position through words alone – for example, "The bag is under the table," – with no pointing. Describe a familiar route. Discuss routes and locations, using words like 'in front of' and 'behind' Make comparisons between objects relating to size, length, weight and capacity. Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc. Combine shapes to make new ones - an arch, a bigger triangle etc. Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs' etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then.'	Explore the composition of numbers to 10. Automatically recall number bonds for numbers 0–5 and some to 10 Select, rotate and manipulate shapes in order to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns. Compare length, weight and capacity.	Numerical Patterns • Verbally count beyond 20, recognising the pattern of the counting system; • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

As well as development matters objectives, the Reception class follow the number mastery scheme to develop vocabulary, methods, representations and skills they will need to support KS1 maths learning.

Maths in Key Stage 1 and Key Stage 2

White Rose is the scheme that we follow to underpin our Teaching and Learning at Leonard Stanley. It is an ambitious scheme which is **designed to challenge pupils**, with its regular reasoning elements, has practical (**experiential**) activities, and a strong focus on vocabulary and **reading** carefully to

understand problems. It is designed to enable children to produce **high quality** work and embed skills.

The content of maths teaching and learning is set out in the 2014 National Curriculum for primary schools in England. Within this, certain areas are repeated across year groups, meaning that children may revisit a particular area in each year of primary school but with increasing difficulty and with a different focus each time.

We ensure each child is confident in each yearly objective and develop their ability to use this knowledge to develop a greater depth understanding to solve varied fluency problems as well as problem solving and reasoning questions. We use a range of resources throughout the school to ensure a curriculum that is specific to each child's learning needs.

We use the CanDo maths structures of: Do, Secure, Deepen and Dig Deeper to develop our lesson activities, enabling the children to reach Mastery. In KS 1 & 2, we structure our timetable so that there are two maths lessons each day – a main Maths lesson in the morning, and an additional “Quick Maths” lesson in the afternoon, after the teacher has had a chance to assess progress from the morning. The “Quick Maths” session can be used to further develop the morning's objective; can be used to extend the learning, with the teacher leading a Deepen It task, modelling good practice; can be used as an opportunity to pick up on issues from the morning and boost the learning through quick, focused intervention; or the session can be a separate activity, reviewing previous objectives or focussing on key calculation skills. KS1 children have two Maths lessons a day. Quick Maths in the morning follows the Number Mastery scheme, to secure the necessary vocabulary, methods, representations and skills they will need to support future maths learning. The main Maths lesson happens later in the morning and any misconceptions are caught up by the Teacher or Teaching Assistants in the afternoon. Children are also encouraged to complete regular homework activities.

We administer the National online multiplication tables check (MTC) to year 4 pupils. The purpose of the MTC is to determine whether pupils can recall their times tables fluently, which is essential for future success in mathematics. It will help schools to identify pupils who have not yet mastered their times tables, so that additional support can be provided. To support the children with their multiplication practice we use ‘Times Table Rockstars’ as an online and fun learning platform which also offer resources to be used in the classroom.

KS2 children also complete daily mental maths sheets, with a variety of quick-fire questions that increase in quantity and complexity to develop fluency, understanding and improve the speed of recall needed to develop in all areas of maths.

Assessment and Feedback

- To ensure that learning build, White Rose build in lessons/ activities that assesses the prior knowledge of the children at the beginning of the new area of learning. This enables teachers to identify any knowledge and skills that need to be focussed on within the unit and also to identify any misconceptions that need to be addressed during lessons.
- We also use ‘common misconceptions’ to start lessons and to develop a stronger understanding of skills learnt.
- We assess predominantly using ongoing formative assessments in class, with teachers giving immediate oral feedback to address any misconceptions that arise. Teachers reflect upon the

learning using 'feedback sheets', which identify teaching points for the next lesson for the class as a whole, or to identify individuals or groups who require further support.

- Assessment information is gathered through observations and discussions with children, using White Rose end of unit assessments and a combination of Rising Stars (PUMA and NTS) tests and previous SATs papers (Year 2 and 6).
- The results from both the formative assessment and summative assessment is then used to determine children's progress and attainment. This data is collated and interpreted using 'Insight'. Actions are identified for individuals and key groups in order to raise attainment where appropriate.

Monitoring & Training

- The maths subject leader attends regular training provided by Gloucestershire LA, which share up-to-date information and good practice. Information is fed back to school staff and actions carried out as a result of the training.
- Regular monitoring activities are carried out by the Maths Subject Leader, Senior Leadership Team and Governors to ensure that progress and attainment in maths is at least good or better across the school. This is done through pupil conferencing, lesson visits, planning audits, learning walks, book audits and rigorous data analysis.
- Cluster moderations, with local schools, ensures attainment and progress is monitored within classes and year groups.
- Staff CPD opportunities are provided when needed. For example: signposting staff to relevant National, GLOW maths or SAS courses available; attending Number Mastery updates and Y2/6 moderation meetings; and inviting Lead teachers from County to discuss strategies and improvement ideas.
- A subject action plan is used to identify how to improve the subject; this is reviewed on a termly basis.

Impact: *What will this look like? What will children be able to do before they leave our school?*

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated reasoning problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

By the time children leave Leonard Stanley Primary School will:

- Demonstrate a quick recall of facts and procedures. This includes the recollection of the times table.
- Show confidence in Believing that they will achieve.
- Show the flexibility and fluidity to move between different contexts and representations of maths.
- Develop the ability to recognise relationships and make connections in maths lessons to develop reasoning skills.

- Master mathematical concepts or skills and can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations.
- Have a high level of pride in the presentation and understanding of the work.
- Achieve age-related expectations in science at the end of each academic year.
- Be ready for their next phase of education in science learning at secondary school by the time they leave Leonard Stanley Primary School.