Ladygrove Primary School and Nursery

Mathematics Policy

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Ladygrove Primary School

Our Vision – *"Every day counts, every minute matters."*

Mathematics at Ladygrove

Intent

At Ladygrove Primary School and Nursery, pupils have opportunities to explore mathematical concepts and build on prior learning, taking small steps towards greater understanding throughout their mathematical learning journey. We provide a mastery curriculum that supports all pupils to reach their full potential and prepares them for secondary school and adult life. Pupils leave Ladygrove with mathematical confidence, a joy of learning and the skills needed for the challenges ahead. In Mathematics, we celebrate **TOUGH TORTOISE** to build resilience when faced with challenge and **WISE OWL** to revisit prior learning, helping pupils to **know more and remember more**.

We believe our pupils should have:

- Confidence in mathematics so they are able to express themselves and their ideas using the language of mathematics;
- An understanding of how mathematics is used beyond the classroom in everyday life and the world of work;
- A passion for mathematical learning;
- An awareness and understanding of relationships within mathematics and the ability to generalise;
- An awareness of the range of strategies that they can use as they apply their knowledge, skills and understanding to solve complex problems in a range of different contexts;
- The ability to persevere and be resilient in their everyday learning.

Implementation

At Ladygrove Primary School, we use the White Rose Maths materials to inform our daily teaching and learning whilst utilising the Teaching for Mastery approach. Teaching for Mastery assumes everyone can learn and enjoy mathematics. Mathematical learning behaviours are taught explicitly during Maths lessons, utilising opportunities for mathematical talk in order to allow pupils to focus and engage fully as learners who reason and seek to make connections. Curriculum design ensures a coherent and detailed sequence of essential content to support sustained progression over time.

Although White Rose Maths provides the initial framework, we recognise the importance of securing retention in Mathematics and using high-quality formative assessment to adapt planning and teaching where necessary. We supplement White Rose Maths with other high-quality resources, including NRICH, NCETM, Convince Me cards and Gareth Metcalfe's I See Reasoning and I See Problem-Solving resources, to promote deeper mathematical thinking.

In Nursery, teaching is informed by the National Day Nurseries Association's Maths Champions programme. This is organised around ten core ideas and focuses on cardinality, comparison, composition, counting, measures, pattern, shape and space, and subitising. These areas are revisited each term.

Ensuring instant recall in Maths is crucial for our children to become successful learners so through the implementation of daily 'Fluency Recap' activities, children are regularly given the opportunity to revisit core concepts and allow misconceptions to be regularly addressed. Through the use of weekly 'My Marvellous Memory' activities, pupils are required to think back to prior learning to ensure their fluency is continually developing, allowing them to **know more and remember more**.

Daily Mastering Number sessions are taught throughout Reception and Key Stage 1. The programme secures firm foundations in number sense for pupils in Reception, Year 1 and Year 2. Over time, pupils

leave Key Stage 1 with fluency in calculation and confidence and flexibility with number. Attention is given to the key knowledge and understanding required in Reception and to progression through Key Stage 1, supporting pupils' future success.

The Number Sense Times Tables Fluency Programme is taught daily throughout Key Stage 2 in addition to the main Mathematics lesson. At the core of the programme are 36 essential multiplication facts. It develops pupils' understanding and recall of these facts and helps them use commutativity to derive multiplication facts up to 9 × 9 and the corresponding inverse division facts. Later in the programme, and in preparation for the Year 4 Multiplication Tables Check, the 11 and 12 times tables are also taught with a lighter-touch approach, alongside practice of the 10 times table. Progress in Number Sense is tracked closely using spreadsheets, enabling teachers to plan weekly intervention sessions for pupils who are not working in line with their peers. This helps pupils to keep up rather than catch up.

At our school, pupils study Mathematics daily, allowing them to develop their understanding of core aspects of the curriculum: number, calculation, fractions, geometry, algebra, measure and statistics. These lessons are structured to build on fluency, reasoning and problem-solving skills, allowing children to become resilient, confident and independent learners. We use the acronym RICC (Read, Interpret, Calculate, Check) when problem solving to provide pupils with reference points to follow in order to encourage logical and systematic thinking. Half-termly, explicit problem-solving lessons are taught to focus on one of the five different types of problem solving: logic, finding all possibilities, worded problems, diagram problems and patterns and rules. These lessons provide all pupils with the skills and understanding of how to approach specific problem types, allowing them to develop strategies to solve complex problems.

Times Tables Rock Stars is used through intervention and homework to promote enthusiasm for, and enjoyment of, learning multiplication facts. This supports pupils across all areas of Mathematics. Rigorous intervention continues into Upper Key Stage 2 for pupils who are not yet fluent in their multiplication tables following the statutory Year 4 Multiplication Tables Check.

Impact

At Ladygrove, the teaching of Mathematics provides pupils with a curriculum that develops the skills, independence and resilience needed to know more and remember more. Each term, we measure pupils' progress using White Rose Maths summative assessments in Years 1, 3, 4 and 5, and past national assessment papers in Years 2 and 6. This enables us to track progress and adapt future planning to improve outcomes for pupils.

Formative assessment is ongoing and takes place throughout Maths lessons daily. We regularly listen to the pupils' voice to inform our planning and measure the impact of our teaching. We aim for our children to be able to articulate their learning, providing clear explanations and key mathematical vocabulary in their answers.

By the time pupils leave our school, we aspire for them to be resilient, independent learners with the knowledge and understanding needed to select and use a range of strategies and resources when facing new challenges. We aim for them to be fluent in key skills and mathematical concepts, equipping them not only for a successful start to secondary school but also to become successful lifelong learners. Through teaching for mastery, we seek to develop confident individuals who can articulate their mathematical thinking and reason effectively.

Role of the Mathematics Coordinator

The Mathematics Coordinator works in conjunction with the Telford and Wrekin Central Cluster, which provides regular moderation opportunities. The Mathematics Coordinator also liaises with external mathematics consultants as appropriate.

The role of the Mathematics Coordinator is to:

- Ensure that White Rose Maths, Mastering Number and Number Sense programmes are implemented consistently.

- Review and monitor planning.
- Monitor Mathematics teaching and evaluate pupils' work, providing feedback and appropriate timescales for agreed targets.
- Arrange liaison with external consultants.
- Work alongside staff to provide support when required.
- Attend relevant training, remain informed about new developments, share these with staff and arrange appropriate professional development.
- Take responsibility for ordering and auditing Mathematics resources.
- Carry out curriculum reviews and report findings to governors and school leaders.
- Update this policy as necessary.
- Create an action plan aligned with School Development Plan priorities, liaising with the link governor.

Teaching and Learning

The Early Years Foundation Stage

Here at Ladygrove Primary School and Nursery, we see Mathematics as a stimulating subject where we meet many challenges and learn from our mistakes. Our curriculum starts the minute children enter Nursery and includes rich opportunities for children to develop their spatial reasoning skills across all areas of Mathematics, including shape, space, and measures.

Opportunities for mathematical learning, linked to the EYFS statutory framework and Early Learning Goals, are provided daily. Through the concrete–pictorial–abstract (CPA) approach, pupils explore new concepts using real-life situations and objects before moving to mathematical representations, such as counters, bar models and ten-frames, and then to abstract numbers and symbols. We are passionate about empowering pupils to see 'inside' a number and develop number sense through subitising.

It states in the Early Years Framework that:

'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.'

The Mathematics ELG states:

'Number Children at the expected level of development will:

- 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.

ELG: Numerical Patterns Children at the expected level of development will:

- 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.'

Key Stage 1

In Key Stage 1, we build on the foundations of Early Years and provide rich mathematical activities linked with children's topics and environment. We use concrete apparatus and begin providing children with opportunities to think deeper in Maths through solving problems.

The National Curriculum for Key Stage 1 states:

'The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.'

Key Stage 2

Building from Key Stage 1, here we enjoy developing the children's mental mathematics, especially in their multiplication recall. We also enjoy our fluency journey, as well as supporting children to think deeper about Maths through Reasoning and Problem Solving. Here, we focus heavily on the use of vocabulary to enable pupils to explain and teach their Maths understanding to others. This helps to embed the learning and supports children in remembering mathematical concepts.

The National Curriculum for Lower Key Stage 2 states:

'The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.'

The National Curriculum for Upper Key Stage 2 states:

'The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.'

Contribution of Mathematics to teaching in other curriculum areas:

Science and Maths

Mathematics and Science are closely linked. Scientific investigations frequently involve mathematical skills such as classifying, counting, measuring, calculating, estimating and recording information in tables or graphs. Skills learned during Mathematics lessons are readily transferable to Science, including the use of charts and graphs to interpret and present data.

Geography and Maths

Cross-curricular skills include:

- Collecting and representing data from field work.
- Grid references and coordinates.
- Using scales on Ordnance Survey maps to establish the distance between two points.

Physical Education and Maths

Cross-curricular skills include:

- Using time, distance and speed in sporting contexts to calculate averages and convert between measures.

- Data can be collected and analysed to assess performances.
- As in Geography, maths skills are needed when orienteering: using grid references, angles and direction.
- Using averages, including the mean, median and mode, to analyse sporting performance.

- Discussing symmetry in dance and gymnastics.

Design Technology and Maths

Cross-curricular skills include:

- Reading Scales.
- Measuring ingredients and working out proportions.
- Using ratios in recipes.
- Measuring materials accurately when making and evaluating products.
- Estimation of quantities of raw materials.
- Properties of shapes and their weight-bearing properties.
- Using computer-aided design (CAD) to present and communicate ideas in Design and Technology.

- Use of nets to create and disassemble products.

Computing and Maths

Cross-curricular skills include:

- Understanding angles and direction when programming.
- Using Excel documents to present and interpret data.
- Using and developing problem solving skills when coding.
- Applying computational thinking and mathematical reasoning when designing and debugging programs.

Art & Design and Maths

Cross-curricular skills include:

- Discussion of symmetry and rotation in Art.
- Use of perspective to aid drawing ability.
- Tessellations.

History and Maths

Cross-curricular skills include:

- Understanding of number lines to support an understanding of time and dates of key events in history.

Music and Maths

Cross-curricular skills include:

- Musical phrases and repetitive patterns.

French and Maths

Cross-curricular skills include:

- Counting in French.
- Dates and times.

Structure of Lessons

Lessons in Key Stages 1 and 2 are structured using quality first teaching, adapting learning where necessary to suit the needs and abilities of all pupils. Daily Maths lessons will be structured with the following elements:

Through assessment for learning tasks, groupings and scaffolds for Mathematics may be adapted according to the pupil's ever-changing needs and abilities.

We use 'My Marvellous Memory' to support the weekly retrieval of knowledge and facts, alongside focused assessment-for-learning activities. This supports pupils in knowing more and remembering more.

Following the guidelines set out in the school assessment policy, continuous feedback is given to children orally within class. We operate a system of 'Pink for Think' marking to develop and extend pupils' learning.

Spiritual, Moral, Social and Cultural Development (SMSC)

Through teaching Mathematics, we can also develop children's spiritual, moral, social and cultural development.

Spiritual Development

- To enable each of our students to explore the connections between their numeracy skills and every-day life.
- To develop deep thinking and an ability to question the way in which the world works.
- To see the sequences, patterns, symmetry and scale both in the man-made and the natural world and to use maths as a tool to explore it more fully.
- To understand that Mathematics includes many different areas and that pupils may succeed in some while finding others more challenging.

Moral Development

- To use maths skills in real life contexts, applying and exploring the skills required in solving various problems.

- To analyse data and consider the implications of misleading or biased statistical calculations.
- To make choices and understand these may lead to various consequences.
- To question and debate mathematical concepts and share ideas with one another, discussing whether or not methods are 'efficient'.

Social Development

- To develop problem-solving skills and teamwork through creative thinking.
- To discuss, explain and present ideas.
- To explain concepts to one another and provide mutual support in learning.
- To become more independent and resilient learners.
- To take part in friendly competition through Times Tables Rock Stars while improving fluency.

Cultural Development

- To understand how Mathematics is a universal language with a myriad of cultural inputs throughout the ages. For example, how the zero was created as a symbol which would create place value.
- To understand how various approaches to mathematics from around the world are used and this provides an opportunity to discuss their origins.
- To develop an awareness of both the history of maths alongside the realisation that many topics we still learn today have travelled across the world and are used internationally.

Inclusion:

We promote equality of opportunity for every pupil, and all pupils have equal access to the Mathematics curriculum. We are committed to preventing discrimination in relation to the protected characteristics. https://www.gov.uk/discrimination-your-rights

We strive hard to meet the needs of those pupils with special educational needs, those with disabilities, those identified as gifted and talented and those learning English as an additional language, and we take all reasonable steps to achieve this.

Special Educational Needs

The school is committed to the early identification of special educational needs and follows the SEND Code of Practice: 0 to 25 years (2015) when identifying and addressing those needs. Please refer to the school's Special Educational Needs and Disabilities Policy for further information.

The Mathematics curriculum is always adapted in a variety of ways to cater for children's abilities and we aim to mark work and give individual support wherever possible to encourage all of our pupils.

In addition, those with learning difficulties may:

• Receive support from a Learning Support Assistant, outside agencies or specialist support staff

• Use specific resources or specialist equipment that may be required to enable the child to take part in practical work

• Pre-teach skills to support individual needs, as appropriate

• Receive interventions linked directly to their need (See the intervention section for further information on this)

Provision for Greater Depth

For those children who are deemed to be high achievers, certain action may be taken:

- Learning adapted and extended to provide opportunities for rehearsal of higher-order skills offering greater challenge.
- Investigations delivered that use and apply their high-order skills and develop their deeper thinking and strategies.

- Opportunities to extend their reasoning skills through explaining their deeper understanding amongst their peers.
- Enrichment opportunities with local Secondary Schools and external providers.

Homework

Homework is set weekly. Pupils are expected to practise their multiplication tables using Times Tables Rock Stars. Teachers may also set additional Mathematics homework linked to current learning.

Resources

Pupils have access to a wide variety of concrete resources. In order to be independent learners, pupils are taught how to use a range of appropriate resources which they can then utilise to solve calculations and problems.

"You'll need a willingness to try things and fail. If you get things right all the time, you don't learn. Meeting a dead end with a problem and then figuring out a new approach to try is what mathematics, and anything worthwhile in life for that matter, is about." William Emeny – The Magic of Pineapples

Policy- Document Status			
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