

The Lanes Primary School Mathematics policy 2019-2020

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INTENT

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 The Lanes, we want to ensure teaching is consistent with all lessons considered as highly effective, so that every pupil receives a great mathematics education. Our ambition is that all children will leave The Lanes with a love of maths and a deep understanding of the fundamentals in key areas.

We aim for all of our children to be strong mathematicians who:

- have a strong conceptual understanding of maths, its structures and its relationships;
- can recall and apply their knowledge confidently and efficiently;
- are secure in using written methods for which they have a clear understanding.

We aim to place problem-solving and investigative skills at the heart of our mathematics teaching. The expectation is that all children welcome challenge and that teachers foster the attitude that we all, even the most able among us, should expect to struggle. Through careful assessment, planning and preparation we aim to ensure that all children progress when they are ready. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should be provided with the opportunity to consolidate their understanding.

IMPLEMENTATION

Curriculum

Our curriculum will work to the expectations set out in the framework document for The National Curriculum in England, September 2013 for Years 1 to 6; and the Early Years Foundation Stage Curriculum, 2014. Our curriculum draws on a variety of resources and best practice, such as those materials published by The White Rose Maths Hub, NRICH, NCETM and Power Maths. Our long-term planning maps ensure coverage of skills and clear progression.

Each class teacher is responsible for the mathematics in their class in consultation with, and with guidance from, their team, the Mathematics Subject Leader and SLT. Teachers plan small steps in learning, enabling deep coverage and mastery of the school's curriculum, through both daily maths lessons and additional opportunities to develop number fluency (Daily Fluency). Whilst there is a suggested weekly planning format (closely following DFE approved scheme Power Maths), teachers are encouraged to adapt their approach to short term planning, so as to best meet the identified needs of their cohort.

Maths is taught daily in a morning lesson that will last around 50 minutes. Daily maths lessons will include teaching, practising, applying and reviewing; and will offer learning tasks that use concrete manipulatives and pictorial models to secure understanding. In addition, to further develop fluency, children across the whole school will take part in a Daily Fluency session lasting 10-15 minutes. This is an opportunity for children to practise and consolidate key skills. Children in Y2-6 will also use Times Tables Rock Stars for multiplication practice and Y1-6 will have access to Manga High.

In daily lessons, classes are mixed-ability and the groups within this are fluid. Teachers will use a range of grouping methods when planning. During a sequence of learning, all children will have access to high quality teaching and learning time with their class teacher, who is best placed to help them make progress. Children's next steps in learning are at the forefront of all planning and achievements are clearly reviewed through regular assessments. Occasionally, children may spend additional time working with an adult on a one-to-one basis or in small groups, to close a gap that has been identified in their mathematical understanding or to provide stretch and challenge activities for those who have grasped concepts swiftly.

Teachers in the Early Years Foundation Stage (Reception) base their teaching on "Development Matters" to ensure that the children are working towards the Early Learning Goals for Mathematical Development. Additional documentation provided by the Maths and Early Years Co-ordinators is also used. The Early Years Foundation Stage teachers deliver some whole class teaching and adult led Maths activities together with the teaching assistant, each day. The children also access a range of Maths activities within continuous provision. Foundation Stage use the Power Maths Scheme and White Rose to complement their weekly planning.

IMPLEMENTATION

Knowledge, skills and understanding

Through careful planning and preparation, we aim to ensure that throughout the school children are given opportunities for:

- practical activities and mathematical games
- problem solving
- individual, group and whole class discussions and activities
- open and closed tasks
- a range of methods of calculating (e.g. mentally, recalling a known fact, a jotting, a formal written method)

Lessons will be structured so that children are exposed to **variation**.

- **Conceptual variation** means that children have the opportunity to work on different representations of the same mathematical idea. This might be, for instance, looking at multiple representations of the number 54: with Dienes, place value counters, Numicon or arrow cards. These multiple representations will 'showcase' to pupils the different conceptual ideas that underpin a mathematical idea. So, in the context of place value, some will reveal the quantity/ value of a digit, some will reveal the importance of position of a digit, others will support the order of the number and some will reveal the additive or multiplicative nature of place value.

Experiencing **concrete**, **pictorial** and **abstract** representations of a concept during a lesson strengthens children's conceptual understanding and fluency. Moving between the concrete and the abstract helps children to connect abstract symbols with familiar contexts, thus providing the opportunity to make sense of and develop fluency in the use of abstract symbols.

- **Procedural variation** is used to support pupils' deeper understanding of a mathematical procedure or process. This might be to compare the same procedure used to calculate two different sets of numbers. By asking the pupils to compare two successive procedures where the first is linked to a second, one can observe relationships, observe the variant and invariant properties of the procedure - i.e. **what stays the same and what changes?** (depending on the numbers/ conditions) leading to generalising about the procedure.

Using conceptual or procedural variation in the design of lessons and pupil tasks encourages the dialogue that enables deeper understanding. Examples are carefully chosen to support pupils to make the desired connections and relationships and ultimately generalisations.

IMPLEMENTATION

Knowledge, skills and understanding

Reasoning is fundamental to knowing and doing mathematics, it enables children to make use of all their other mathematical skills. At The Lanes, children are given opportunities to apply their skills, to develop becoming systematic thinkers and also acquiring the ability to articulate such thinking in a clear, succinct and logical manner.

At the Lanes, problem solving is included at the start of every lesson. When a new concept is introduced, teachers provide a 'Discover' task to get children to solve a problem that aims to generate curiosity. During the Discover section, children may also use manipulatives to help them understand the maths and explain their method. Children are then encouraged to 'Share' the methods they have tried to solve the problem. Children are encouraged to follow the philosophy 'we only learn when we are thinking'. The teacher then takes the approach "I do, we do, you do", as children apply the knowledge they have just learned in a series of problems that continue to encourage thinking throughout. After independent work, the children are then encouraged to 'Reflect', allowing them to evaluate whether they have understood the key concept and small steps that they have been trying to master in the lesson.

To further support reasoning and problem solving, we have introduced a selection of Mastery Prompts (based on the NRICH five step progression). These are teaching tools to encourage children to describe, explain, reason, justify and prove their mathematics. During the lesson, teachers verbally use these to prompt children to deepen and rationalise their understanding. Mastery prompts include: Prove it; Always, Sometimes, Never; Explain it; Coaching; Maths Story and Step by Step.

Intervention

Within any cohort, there will be children who need support in Mathematics to secure attainment at age-related expectations. We ensure that children who need it benefit from various intervention. This could take the form of:

- being supported through additional meetings between teachers and parents to discuss ways of collaborative working and strategies to close the gap
- being observed/assessed by the SENCO to ensure that any obvious barriers have been identified, and so that appropriate provision can be put in place
- receiving some pre-teaching of concepts before they are encountered as a class
- being part of an additional teacher focus group during daily lessons / early morning time, to address misconceptions
- being invited to attend additional teaching sessions (either one-to-one or as a small group) – usually in the afternoons, but not exclusively)
- being timetabled to join in the Manga High club and Times Tables Rockstars groups

IMPLEMENTATION

Presentation

From Foundation Stage to Y6, maths learning is recorded in large yellow books. Daily Fluency is recorded in smaller yellow maths jotters. When working in the large yellow books, every piece of work has a date and a Learning objective (LO).

Lower down the school, this may be stuck in. There is an expectation across the school that 1 square = 1 digit.

Marking

Marking in maths will usually request mistakes be corrected using a dot or 'ch' symbol, but never a cross. These are usually highlighted beside the appropriate calculation/problem. Where a child frequently makes the same mistake this may be highlighted as a target and staff may then do one of the following:

- Work individually with that child
- Provide resources to support them going forward
- Ask them to practise that skill

The symbols TS/SS/I are used to highlight how much support a child has had. They are either written beside specific calculations or at the bottom of the page. When SS is used, the marker records what that specific support was. Staff may scaffold a child through a problem by working with them using a green pen, encouraging them to do the mathematical thinking as much as possible.

Challenge may be identified using the challenge thunder bolt beside an extension problem or a comment/question to further learning.

Incorrect number formation is highlighted and children are expected to make corrections or practise at the bottom.

Children will begin to check their own maths work right from Foundation Stage and develop this skill throughout the key stages. Children in Year 2 onwards begin to use purple pen to respond to marking. They will be expected to do this independently by the end of Year 5.

Assessment

Teachers are expected to make regular assessments of pupils' progress and to systematically record this against NC Objectives/EYFS Development Matters in the tracker. The Assessment Lead monitors records on a frequent basis.

In order to make accurate assessments of progress, teachers may draw upon a range of sources:

- Assessments made whilst a lesson is in progress (AfL)
- Observations of learning
- Manga High records
- Times Tables Rock Stars records

- Scholastic assessments
- Test Base
- Scholastic termly assessments
- Pupil conferencing
- Pupil's written work
- Pupil's oral work
- Feedback from teaching assistants
- Intervention records and discussions with the SENDCO
- Feedback from parents/carers

All assessment will then be used to inform planning, set individual pupil targets and contribute towards whole school initiatives.

Leadership

To tackle barriers to success and ensure consistency, our Mathematics Team are responsible for:

- Writing and delivering an annual action plan to address areas of concern, with consideration for the wider school improvement needs.
- Ensuring teachers understand the requirements of the new National Curriculum and support them to plan lessons, where needed.
- Monitoring and evaluating teaching and learning through lesson observations; work; planning; and planning and progress reviews; sharing the outcomes of this work with the Head teacher, Governors and external advisors as required.
- Robustly challenging weak teaching and identifying what support or development is needed.
- Using the information gathered from data analysis and monitoring activities to improve teaching and the curriculum.
- Tracking the effectiveness of maths interventions, in conjunction with class teachers, the Head teacher and SENDCO.
- Attending CPD and disseminate knowledge through staff meetings/INSET.
- Preparing, organising and leading CPD for colleagues as necessary, sometimes supported by consultants.
- Ensuring each classroom has the appropriate resources required to deliver the curriculum effectively and, where necessary, use the maths budget to fill gaps.
- Keeping parents/carers informed about mathematics issues.

The Maths Team will work in partnership with other members of SLT, particularly the SENDCO and our Governing Body, in raising standards in Mathematics across our school and maintaining the high profile of mathematics in the School Improvement Plan.

IMPACT

Key Strengths

- Daily Fluency is helping pupils to embed and retain previously taught skills
- Arithmetic, especially within upper KS2

Areas for Improvement

- Consistency of good lessons across all Key Stages
- Supporting struggling staff through coaching and intervention
- Ensure timely interventions for those children falling behind with fluency
- Improving progress in KS2
- Closing the gap between boys and girls