

LITTLE KINGSHILL COMBINED SCHOOL

Mathematics Policy



Date Issued: Autumn 2023

Review Date: Autumn 2026

1. Introduction

“Mathematics equips pupils with a uniquely powerful set of tools to understand and change the world. It 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.”

(The National Curriculum 2014)

The new National Curriculum, which came into effect from September 2014, is underpinned by the concept of mastery. The backbone of Mastery of Mathematics at Little Kingshill Combined School is taught through the Power Maths programme.

The Power Maths programme provides:

- ‘Power Maths’ is specifically designed for UK curriculum classrooms by leading mastery experts from around the world and recommended by the Department for Education. Mastery is built on the proven approach to teaching mathematics in Singapore, recognised globally as one of the most impactful ways to teach and learn maths.
- a child-centered lesson design that models and embeds a growth mindset approach to maths and focuses on helping all children to build a deep understanding of maths concepts.
- understanding for mastery by promoting fluency, reasoning and problem solving through the use of spiral progression. This builds knowledge over time, enabling all children to become confident mathematicians.
- secure foundations and deep understanding of mathematical concepts by building on a concrete - pictorial - abstract approach
- accessible pupil textbooks introduce concepts in a highly scaffolded way, enabling all pupils to develop critical thinking skills, make mathematical connections and become confident mathematicians
- Power Maths’ guided sessions promote discussion and exploration, with a strong emphasis on mathematical language, speaking in full sentences, and reasoning (by children consistently being required to explain how they know).

2. Aims and Objectives

2.1 Aims

At Little Kingshill Combined School, we intend for our pupils to confidently use mathematical knowledge, language and reasoning to encourage deeper thinking, discussion and seek connections to other subjects and the wider world.

We want to make sure that pupils develop to their fullest capabilities, not only the mathematical skills and understanding required for later life, but also an enthusiasm and fascination about maths itself. Following a ‘mastery’ approach, our aim is to develop resilient learners, who value mistakes as a learning opportunity to continue to challenge themselves. Teaching is represented through a concrete, pictorial and abstract approach to represent learning in different ways and ensure that children are secure in their understanding and fluency.

In our teaching of mathematics at Little Kingshill Combined School we aim to:

- ensure that all pupils are working at age related expectations
- encourage pupils to enjoy mathematics
- enable pupils to have opportunities for mathematical thinking and discussion
- enable pupils to talk confidently about what they are doing in mathematics

- increase pupils' confidence in maths so they are able to express themselves and their ideas using the language of maths
- promote an enjoyment and enthusiasm for mathematics
- ensure numeracy skills are developed as well as a confidence to work mentally
- provide opportunities for pupils to demonstrate and use their mathematics
- give pupils opportunities to use mathematics in everyday situations
- give pupils opportunities to be creative and imaginative in their use of mathematics
- help pupils to understand that mathematics is a powerful tool for communication
- help pupils recognise that mathematics is a search for pattern and relationship
- instil a fascination for mathematics and the manipulation of numbers
- encourage pupils to take responsibility for their own learning
- provide a role-model by using mathematics for practical purposes, organisational and administrative tasks
- continually improve the teaching, learning and experiences of mathematics for every child

2.2 Objectives

As a school we will:

- ensure the environment is stimulating and supportive
- create challenging activities in which pupils can experience success
- value the achievement of each child
- build upon the knowledge and skills which pupils have gained formally and informally
- give the pupils mathematical experiences which match their ability and stage of development, plus are structured and maintain a good pace
- organise both collaborative and individual activities
- make clear to the pupils the purpose and relevance of any mathematical activity
- give the pupils opportunities to talk about and discuss techniques, methods and ideas
- keep records of the pupils' progress and achievements and set realistic targets
- encourage independent use of a variety of apparatus and equipment
- use maths in cross-curricular topics wherever appropriate
- help pupils reflect on each new experience
- stress the importance of, and encourage the use of, mental calculation as a first resort to any problem
- establish routines to help pupils structure the organisation of an activity
- rehearse skills and strategies daily
- allocate Year 6 maths ambassadors to work alongside the math's lead to raise the profile of maths in the school by helping to organise special maths days and events throughout the year.

3. Planning

The teachers in Reception, Key Stage 1 and Key Stage 2 follow the Power Maths planning scheme of work. By following this, each year group will teach the blocks in the appropriate order depending on the needs of the pupils.

All staff endeavour at all times to set work that is achievable yet challenging, motivating and encourage the pupils to talk about what they have been doing.

3.1 Cross Curricular Links

Mathematics contributes to many subjects in the primary curriculum, often in practical ways, and therefore it is important that time is found in other subjects for pupils to develop their mathematical skills e.g. measuring in science and technology.

4. The Daily Lesson

Mathematics from Reception to Year 6 is taught through the Power Maths programme.

A typical lesson will follow the teaching guidance. This may include a range of the following activities:

- **Power Up/Fluency Building-** An activity designed to support fluency in all key number facts.
- **Input/Class Share-** Children share, reason and learn from misconceptions through whole-class discussion and a feedback starter based on previous learning. Scaffolding is carefully reduced to prepare children for independent practice. Children consider solutions as a class, with partners and independently.
- **Practice-** Designed to be completed independently, this practice uses conceptual and procedural variation to build fluency and develop deeper understanding of underlying mathematical concepts. A challenge question and links to other areas of maths encourages children to take their understanding to a greater level of depth.
- **Reflect/Plenary-** This is an opportunity for children to review, reason, and reflect on learning and to help you to gauge depth of understanding. In Reception, this is done through a weekly group or 1:1 discussion.

5. Teaching and Learning Strategies

5.1 Heuristics for problem solving

Heuristics refers to the different strategies that pupils can adopt to solve unfamiliar or non-routine problems. These strategies include bar modelling, pattern-spotting, using diagrams and estimating or 'guess or check'. The practice books reinforce concepts introduced in the pupil textbooks and provide varied practice to develop fluency. Pupils begin to self-select the appropriate strategy for each problem, helping them become confident problem solvers.

5.2 The Concrete-Pictorial-Abstract Approach

The Concrete-Pictorial-Abstract approach is used to build a secure sense of numbers. This is done through a series of carefully structured representations – first using physical objects (concrete), then diagrams or pictures (pictorial) and ultimately using representations such as numerals (abstract).

All classes have access to a variety of resources which are to be used when introducing new concepts.

5.3 The Bar Model

The bar model is a step-by-step method that helps pupils to understand and extract the information within a calculation or word problem. Simple bar modelling is introduced from Year 1, being built upon as the children move through the school. By drawing a bar model, pupils translate a calculation or word problem into a picture. The approach allows pupils to process the information given, visualise the structure, make connections and solve the problem.

5.4 Higher order questions

Power Maths is designed to stimulate thinking beyond the activities from the pupil textbooks. Activities are designed to generate meaningful conversations through questioning, giving pupils opportunities to think mathematically, discover connections and be creative.

5.5 Variation

Mathematical and perceptual variation deepens understanding as it constantly challenges and develops existing understanding by looking at questions from different perspectives and adapting to new situations. Variation challenges pupils to use their mathematical skills flexibly to suit the situation, deepening understanding.

5.6 Textbook and Practice Book Formats

Textbooks present new learning clearly and consistently, providing a highly scaffolded framework to support all pupils. Mathematical concepts are represented visually, with specific and structured activities, to build firm foundations. The textbooks are broken into several different sections to build upon skills to support understanding and lead towards mastery.

5.7 Other resources

Although the main bulk of mathematics teaching is based on the Power Maths programme, other resources are used to meet learning objectives and deepen understanding. These may include, but not be limited to, Classroom Secrets, White Rose resources, Deepening Understanding, NCTEM, Nrich, Target Maths etc.

6. Classroom management and Differentiation

6.1 Classroom Management

Quality First Teaching ensures all pupils, whatever their ability, are taught within a class group, with all pupils working on the same concept. Pupils work in mixed ability groupings to develop mathematical discussion and explanation. Those who require further challenge or support are provided with intervention as identified through the teaching sequence, marking and assessment.

6.2 Resources

Resources for the delivery of the maths curriculum are stored both centrally and in classrooms. Everyday basic equipment is kept in classrooms. Additional equipment and topic-specific items are stored centrally.

6.3 Challenge

Challenge work is given to those who have shown they fully understand and can apply skills using a different example and are not accelerated into new content. Where possible, pupils will be encouraged to choose their own differentiated activity and work at a level of challenge that is right for them.

6.4 Interventions

We aim to provide a 'keep up not catch up' mentality and teachers quickly intervene when they identify that a child or a group of children have not sufficiently grasped the concept that has been taught. Teachers will continually evaluate the learning of all children through high-level questioning, monitoring and feedback. However, if there are individuals who are not grasping concepts to the expected level, teachers are to ensure that suitable resources are being used to enable individuals to

visualise the mathematics. If the expected progress is not made, teachers are to speak to the SENCo about further intervention.

7. Homework

KS1 children will complete 20 minutes weekly practice on Number Bots or Times Tables Rock Stars to build timestables recall and number fluency.

According to the School Homework Policy, KS2 children are to complete a 20/30 minute task set on Atom Prime once a week, consolidating current learning in the classroom. Furthermore, the Curriculum Overviews on each Class Page may be useful for at home extra practice by following the video links alongside each week's Maths topic.

8. Assessment

Assessment is an integral part of the teaching process. Accurate assessments allow for the matching of the correct level of work to the needs of the pupils, thus benefiting the pupils and ensuring progress. It occurs throughout each lesson using different assessment for learning strategies.

These assessments will be used to inform teaching in a continuous cycle of planning, teaching and assessment.

Questioning

Questioning is used regularly within mathematical discussions and assessment. It is vital for drawing out children's understanding and identify and misconceptions immediately. Examples of these questions include:

- How do you know?
- What do you know?
- What do you see?
- What is the relationship between...?
- Say it in a full sentence
- What if...
- Prove how you know
- Talk to me in fractions/measure/ shape properties (correct maths vocab)
- Is there another way?
- Use resources to explain your thinking
- Tell me about...
- Show me another way
- If you know that, what else do you know?
- What is the same and what is different?
- Can you be more specific?
- Does that always apply?
- What makes you think that?
- How does that fit in (with)
- What is happening?
- What is likely to happen?

Short-term assessments will be an informal part of every lesson to check the pupils' understanding and give information, which will help the class teacher to adjust day-to-day lesson plans. Pupils requiring additional support are quickly identified and intervention is provided through further teaching and practice.

Medium-term assessments will take place in an assessment period timetabled each term and will assess the pupils' progress towards the end of year objectives. Interventions are then adjusted to meet the needs of individuals and support progress.

Long-term assessments will take place towards the end of the school year to assess and review pupils' progress and attainment. These will be made through Foundation Stage Profiles in Reception. Statutory National Curriculum mathematics tests are administered for pupils in Year 2 and Year 6. Teacher Assessments draw upon their class record of attainment against key objectives and supplementary notes and knowledge about their class to produce a record of a child's performance in Years 1, 3, 4 and 5. Accurate information will then be reported to parents and the child's next teacher.

Regular end of unit assessments are provided through the use of 'End of Unit Checks'. These include main assessments, check-ups and challenging problems. They support to assess pupil's mastery of concepts and create a record of individual progress. In addition to regular end of term assessments, these provides a range of summative assessments that can be used to identify gaps in learning for immediate intervention and opportunities for further practice, challenge or enrichment. They also provide opportunities for pupils to self-reflect, celebrate success and build confidence.

Topics and concepts are frequently revisited in all types of assessment, helping to build mastery.

Teacher assessments are recorded on Insight at the end of each term.

For more information about assessments at Little Kingshill Combined School please refer to our Assessment Policy.

9. Special Educational Needs

All pupils have equal access to the mathematics curriculum. Activities provided take into account individual ability with a good level of challenge; the use of open-ended activities and skilled questioning help to support pupils with special needs.

The SENCo and Mathematics Co-ordinator will be involved in ensuring that pupils with significant needs in mathematics should have specific mathematical targets when provision maps or SEN support plans are produced.

10. Management and Organisation

Mathematics will be monitored by the Subject Coordinator, SLT, Assessment Co-ordinator, Governors and Staff through the regular evaluation of Mathematics provision within the school.

10.1 Role of the Assessment Coordinator and Head Teacher

- Feedback to governors about attainment and progress
- Monitor and analyse targets, SATs results and teacher assessments

10.2 Role of Subject Leader

- Ensuring continuity and progression from year group to year group.
- Providing all members of staff with guidelines and a scheme of work to show how aims are to be achieved and how the variety of all aspects of mathematics is to be taught.
- Providing in-service training to staff, where appropriate. This will be in line with the needs identified in the Development Plan.
- Advising and supporting colleagues in the implementation and assessment of mathematics throughout the school.
- Assisting with the purchasing and maintenance of resources required for the teaching of mathematics.

- Exploring enriching Mathematics experiences for children within our school.
- Arranging CDP training for members of staff, where appropriate
- Keep the governing body informed of changes within the mathematics curriculum.

10.3 Role of Class Teacher

- Teach the mastery approach using Power Maths so that all pupils have full access to the curriculum, enabling them to achieve confidence and competence – ‘mastery’ – in mathematics
- Have the expectation that the majority of pupils will move through the programmes of study at broadly the same pace
- Make decisions about when to progress should always be based on the security of pupils’ understanding and their readiness to progress to the next stage.
- Identify pupils who are not sufficiently fluent with earlier material so additional practice and consolidation can take place. Advice may be sort from the mathematics coordinator or the SENCo.
- Challenge pupils who grasp concepts rapidly through offering rich and sophisticated problems before any acceleration through new content.
- To keep assessment results up to date
- To inform parents of pupils’ progress, achievements and attainment

11. Parental Involvement

At Little Kingshill Combined School, we encourage parents to be involved by:

- inviting them into school twice yearly to discuss the progress of their child
- inviting parents into school in the summer term to discuss the yearly report
- inviting parents to curriculum evenings or circulating information via half-termly newsletters when significant changes have been/are made to the mathematics curriculum
- encouraging parents to help in classrooms when appropriate

12. Marking

In line with our school’s marking policy, teachers highlight, in green, areas where children have solved the problem correctly using the correct working. Teachers highlight, in pink, where children have made errors in their working. This enables children to quickly identify areas where they have succeeded or need to check their working. Children mark their work with purple pen and traffic light their lesson green, amber or red based on their confidence level. For more information please refer to our Marking and Feedback policy.