

Bowlee Park Community School

Mathematics Policy

Our School Motto; Knowledge... your passport to the world!

Bowlee Values - Respect, Kindness, Ambition, Resilience, Cooperation, Responsibility

British Values - Democracy, Rule of Law, Individual Liberty, Tolerance and Respect

Rights Respecting Schools - Article 28; 'Every child has the right to an education'

Bowlee Behaviour Principles – Be Ready, Be Respectful and Be Safe

1. CURRICULUM INTENT

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 is 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

A Curriculum for Our Pupils

Mathematics is integral to all aspects of life and it is essential that children develop a positive and enthusiastic attitude towards mathematics to enable them to become confident mathematical learners. Our curriculum is based on key constructs: fluency, structure and representation, variation, problem solving and coherence. In designing the maths curriculum we have taken into account the wide ranging social and economic backgrounds of our families. Our maths curriculum accelerates pupils' acquisition of maths knowledge, with a significant focus on fluency facts, and prioritises understanding mathematical concepts and applying skills in a variety of ways.

A Curriculum of Breadth and Wider Opportunity

Mathematics equips pupils with a powerful set of tools to understand and change the world and to become well-informed citizens. These tools include logical reasoning, problem solving skills and the ability to think in abstract ways. Maths skills are prioritised so that children are able apply their learning across the curriculum and use their knowledge in subjects such as science, technology and to promote financial literacy.

Progressive, Well-sequenced Learning that Embeds Knowledge

Our mathematics curriculum delivers progressive and cumulative knowledge and skills acquisition. There are well-sequenced long term, medium term and short term plans to ensure the logical teaching of knowledge and skills through each key stage, year group and in units of work. Knowledge, together with skills and opportunities to apply learning, leads to strong progress in mathematics.

A Curriculum where Reading is a Priority

Reading has the highest priority at our school. It enables pupils to access the full curriculum. Pupils learn to read from day one in reception- and earlier if they attend our nursery. There are many opportunities to embed reading skills in maths through the use of reading text books, work books and problem-solving activities.

A Curriculum that Develops Core Values

Our maths curriculum enables our pupils to develop into confident mathematicians who are able to work with others. It helps them to develop respect and perseverance. Mathematical knowledge is essential for pupils' to be well-informed citizens and to appreciate human creativity and achievement.

Aims in the Teaching of Mathematics

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 have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- 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
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.

Objectives in the Teaching of Mathematics

- to promote confidence and competence with numbers and the number system;
- know by heart number facts such as number bonds, multiplication tables, doubles and halves etc.;
- use what they know by heart when calculating mentally;
- calculate accurately and efficiently, both mentally and in writing and paper, drawing on a range of calculation strategies;
- make sense of number problems, including non-routine/'real' problems and identify the operations needed to solve them;
- explain their methods and reasoning, using correct mathematical terms;
- judge whether their answers are reasonable and have strategies for checking them where necessary;
- suggest suitable units for measuring and make sensible estimates of measurements;
- explain and make predictions from the numbers in graphs, diagrams, charts and tables;
- develop spatial awareness and an understanding of the properties of 2d and 3d shapes;
- to establish firm foundations in key mathematical concepts to allow the development of a deeper and more cohesive understanding of complex mathematics over time;
- to promote mathematical thinking/explanations both orally and in writing;
- to develop the ability to confidently work both collaboratively and independently in maths;
- to be confident using maths knowledge in a variety of contexts;
- to promote the enjoyment of maths.

Mathematics Curriculum Planning

The National Curriculum Programme of Study for mathematics describes in detail what pupils must learn in each year group. Combined with the Bowlee Park School's Calculation and Fluency Policy, this ensures continuity and progression and high expectations for attainment in mathematics.

At Bowlee Park Primary School we use the National Curriculum for Mathematics as the basis of our mathematics programme supported by the 'Power Maths' planning guidance. We are committed to ensuring that all pupils achieve mastery in the key

concepts of mathematics, appropriate for their age group, in order for them to make genuine progress and avoid gaps in their understanding. Essential components of the Bowlee Park Primary School approach to teaching maths are:

- a logically sequenced and carefully planned curriculum so that children make progress (knowing more and remembering more);
- an emphasis on automaticity with mathematics facts;
- a focus on problem solving and the development of mathematical thinking;
- consolidation and repetition of key learning;
- assessment to ensure pupils have acquired understanding and automaticity in the facts, concepts and procedures required.

Short term planning is recorded each week on standard planning sheets. These plans outline the topic area/focus with specific learning objectives to be taught that week along with the teaching approach and resources to be used to support learning.

Problem Solving

At Bowlee Park Community Primary School, problem solving is one of the key purposes of our maths curriculum and we provide children with opportunities to solve problems, to reason, to think logically and to work systematically and accurately.

Maths problems often require established procedures and knowing what and when to apply them. To identify procedures, children have to be able to collect the appropriate information, identify a strategy or strategies and use the strategy appropriately.

At Bowlee Park Community Primary School, our daily maths lessons provide our children with opportunities to practise and apply their mathematical knowledge through the mastery approach to teaching. We recognise that we must teach children how to problem solve and provide them with strategies to enable them to do this successfully. As a result, we ensure that children are faced with a range of problems including word problems, logic and deduction problems, finding all possibilities, patterns and puzzles, diagram and visual problems.

Learning Behaviours

In developing confident mathematicians, it is also important that children develop learning behaviours. These include: independence, reflection, resilience, participation and familiarity.

In developing **independence** it is important that the teacher provides children with a starting point and allows them to explore. They act as an adviser, listening and prompting when needed. Children should be encouraged to ask their own questions to further their understanding.

Being **reflective** involves children to coming up with new ideas or questions to ask. They make conjectures and begin to investigate them. To support children, it is important that teachers discuss ideas, share reflections with others and encourage revision.

Resilience is essential. Children need the skills and confidence to work on a problem for an extended period of time and/or, return to the problem with little prompting. They also need strategies for when they are 'stuck' so that they can confidently take alternative routes and discuss why they are stuck.

Children should **participate** by taking an active role in discussions, offering and sharing ideas, questioning each other and listening carefully. Teachers should encourage these discussions and listen to the responses.

Familiarity involves making links and relating the problem to other contexts or problems that they have been exposed to. This knowledge will enable them to identify a starting point, pose questions of their own and extend their problem solving abilities.

The Early Years Foundation Stage

Bowlee Park School follows the EYFS curriculum guidance for Mathematics. We are committed to ensuring the confident development of number sense and put emphasis on mastery of key early concepts. We have high expectations so that children achieve a secure understanding of the number system to 10 and the development of models and images for numbers as a solid foundation for further progress. Pupils are involved in manipulating numbers through calculation processes. Pupils also learn about pattern, shape, space and measure through a range of teaching activities and practical activities.

The Contribution of Mathematics across the Curriculum

Mathematics contributes to many subjects and it is important that children are given opportunities to apply and use mathematics in real contexts. Therefore opportunities are found in other subjects for pupils to develop their mathematic skills, e.g. there should be regular, carefully planned opportunities for measuring in science and technology, for the consideration of properties of shape and geometric patterns in technology and art and for the collection and presentation of data in history and geography. We endeavour at all times to set work that is challenging, motivating and encourages pupils to think about how they learn and to talk about what they have been learning.

Ambition and Access for All to the Maths Curriculum

We follow the principles of the National Curriculum to meet the needs of all children in maths. The National Curriculum states, *'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 consolidate their understanding, including through additional practice, before moving on.'*

In designing our curriculum, we have ensured that the programme of study is well sequenced and delivered in small steps. In lessons, content is repeated and revisited to enable children to retrieve prior learning and develop fluency. We regularly plan opportunities for spaced practise to ensure knowledge is retained and children make progress.

In maths we use two approaches: adaptive teaching and differentiation.

The majority of children access age appropriate objectives through adaptive teaching. For all pupils (including those with SEND), teaching is adapted through a range of strategies including: breaking down learning into smaller chunks; adult support; reframing of questions; use of concrete and visual resources. Higher attainers are challenged through more demanding problems, which deepen their knowledge of the same content before acceleration onto new content. Children's difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention – commonly through individual or small group coaching.

Differentiation in the mastery context is implemented through the support and intervention provided to different children, not in the topics taught, particularly at earlier stages. For some children (particularly those with the highest level of SEND), further differentiation is needed through the adaptation of learning objectives,

teaching materials and strategies in order to access learning. The National Curriculum states, *'Decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage.'* If a child's needs are best met by following an alternative plan, including coverage of the content from a previous year then this will be planned by the class teacher, with the support of the maths team and SENCOs. Teachers consider the specific needs and targets set for pupils with Special Educational Needs and Disabilities (SEND) and children whose first language is not English, when planning and implementing the maths curriculum. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during SEND reviews.

Equality for All

At Bowlee Park Primary School we are committed to promoting equality of opportunity, eliminating discrimination and harassment, valuing diversity and promoting positive relationships. We meet the requirements of the Equality Act 2010 and provide an inclusive education to enable all pupils to develop their full potential.

Our school delivers a broad and balanced curriculum for all pupils and we address individual needs irrespective of gender, ability, religion or ethnic origin. The curriculum avoids stereotypes and provides good role models for all pupils. We ensure the curriculum is not delivered in a discriminatory way.

2. IMPLEMENTATION

Teaching and Learning of Mathematics

Children are taught through whole-class interactive teaching, where the focus is on all children working together on the same lesson content, whilst at the same time challenging and supporting pupils to gain depth of understanding and proficiency. This ensures that all children have a secure understanding of concepts before moving to the next step and over time our children are expected to have the ability to reason and clearly explain their thinking. Children who are struggling to grasp concepts will have further adult input or a catch-up session to ensure that all children are maintaining progress and have the knowledge and automaticity to use a mathematical concept in more complex ways. Some children who have significant gaps in their knowledge will require teachers to specifically identify a programme of study to remediate gaps and to develop automaticity in key aspects of the mathematics curriculum.

Teachers design lessons so that there is a carefully sequenced journey through the concept being taught, identifying difficult points and possible misconceptions. Children are challenged through careful questioning and supported through use of concrete materials and visual representations to develop deep, conceptual understanding. A range of resources, including Department for Education approved text books, are used to support children's learning.

Teachers use a range of teaching strategies and ensure progress is made by all children within a class; no set formula is used but teaching is based on the 'mastery' approach/principles. Typical features include:

- lessons designed to build concepts in small progressive steps;
- lessons that encourage thinking, use precise mathematical language and allow children to deepen their understanding of the concept;
- a balance of interactive whole-class teaching, guided group/paired work and individual pupil work, including intelligent practice and reflection;
- the use of concrete materials and pictorial visual structures leading to abstract

- understanding;
- the idea that the majority of children will be working at the age related expectation – keep up not catch up;
- staff regularly checking understanding to ensure that every child is keeping up and follow the cycle of assess, plan, do and review;
- differentiation mainly through questioning, support, apparatus, challenge and outcome - the focus of the lesson may vary for a small number of children depending on their learning needs;
- as part of the sequence of learning there will be lessons where the focus lesson will be new learning and at other times pupils may be practising to master the concept they have learned earlier;
- children may be given extra support in addition to the daily maths lesson, if needed, in order to close or narrow the gap - this may be referred to as 'same day intervention';
- teachers are expected to adhere to the school's maths marking policy when marking books and presentation policy when guiding children as to how to present their work.

We recognise the importance of establishing a secure foundation in mental calculation and recall of number facts before standard written methods are introduced. We use accurate mathematical vocabulary in our teaching and children are expected to use it in their verbal and written explanations. Teachers plan regular problem solving and investigational activities to ensure that pupils develop the skills of mathematical thinking and enquiry.

To provide adequate time for developing mathematics, maths is taught daily and discretely. In addition to daily mathematics lessons, fluency work is timetabled to ensure all children are confident and competent in key age-related mathematics facts, concepts and procedures. In the Foundation Stage and KS1 the NCETM Mastering Number programme is followed to ensure children are confident, fluent mathematicians. We also provide opportunities for mathematical skills to be embedded across a range of subjects where appropriate.

Resources

All classrooms in school have a wide range of mathematical resources. A Department for Education approved text and workbook book scheme (Power Maths) is used as a key teaching and learning tool. Each classroom is provided with a range of mathematical equipment and visual structures such as Numicon, base ten, place value counters, number lines, number squares, digit cards, number fans and other small apparatus to support learning. Mathematical dictionaries are available in all classrooms to enhance mathematical vocabulary knowledge. In addition, there are a range of published materials to support the delivery of high quality maths teaching in all year groups, which link to the long and medium term plans.

ICT based resources are used by children to support the practise of key skills such as number bonds, multiplication facts etc. There are also a number of interactive teaching tools for the teacher to use on the Smart Board to support their maths teaching.

Each classroom should have a maths display relating to current work. Maths displays are updated regularly to reflect the pace of learning. Displays can include: key vocabulary, children's work, teacher modelling, visual prompts and questions to develop reasoning skills.

3. IMPACT

Assessment in Mathematics

Teachers assess children's work in mathematics using formative and summative assessment methods.

Teachers integrate the use of formative assessment strategies such as effective questioning, clear learning objectives and effective feedback and response in their teaching. The maths marking policy encourages marking at the point of learning so that any misconceptions can be identified quickly and acted upon by adults. There are ongoing pre and post unit checks and assessments to assess understanding and to assess retention of knowledge and skills. There are regular low-stakes tests to build memory to automaticity through over learning facts, concepts and procedures.

Termly summative maths assessments are conducted through formal tests, which are used to inform termly teacher assessments.

We make long-term summative assessments using standardised tests towards the end of the school year. We use the national tests for children in Year 2 and Year 6, plus high-quality curriculum assessments for children at the end of Years 1, 3, 4 and 5. These tests along with teacher assessment judgements from over the year are used to assess progress against school and national expectations. We then set targets for the next school year and make a summary of each child's progress before discussing it with parents and carers. We pass this information on to the next teacher at the end of the year, so that they can plan for the new school year.

Monitoring and Review

The quality of teaching and learning in mathematics is monitored and evaluated by the headteacher, senior leaders and the maths team as part of the school's agreed cycle of monitoring. This cycle includes:

- planning scrutiny
- work scrutiny
- lesson observations
- interviews with teachers
- discussion with pupils
- assessment data analysis and pupils progress meetings
- action planning to develop mathematics curriculum development and teaching and learning based on the outcomes of monitoring.

The Role of the Subject Leader/Mathematics Team

- Ensures teachers understand the requirements of the National Curriculum and teaching and learning is in line with this document.
- Prepares a subject action plan and meets regularly with the designated senior leader and the mathematics link governor to discuss progress and outcomes.
- Monitors and evaluates mathematics provision in the school by conducting regular planning scrutiny, work scrutiny, lesson observations, interviews with teachers, discussion with pupils and assessment data analysis.
- Organises and leads CPD and joint professional development.
- Observes colleagues with a view to identifying the support they need.
- Attends appropriate CPD.
- Keeps parents informed about mathematics.
- Raises the profile of mathematics across the school

This policy will be reviewed at least every two years.

Next review Date: September 2026