

Our vision for Maths at Birley Spa Primary Academy

Mathematics Intent

The 2014 National Curriculum for Maths aims to ensure that all children:

- Become fluent in the fundamentals of Mathematics.
- Are able to reason mathematically.
- Can solve problems by applying their Mathematics.

At Birley Spa Primary Academy, these skills are embedded within Maths lessons and developed consistently over time. We are committed to ensuring that children are able to recognise the importance of Maths in the wider world and that they are also able to use their mathematical skills and knowledge confidently in their lives in a range of different contexts. We want all children to enjoy Mathematics and to experience success in the subject, with the ability to reason mathematically. We are committed to developing children's curiosity about the subject, as well as an appreciation of the beauty and power of Maths.

Mathematics Implementation (including pedagogy)

Maths lessons can vary according to the needs of each group of children; however, many aspects of a maths lesson will be consistent throughout school. The usual lesson format is: Revisit/Anchor task, Teach, Practise, Apply, Review (Plenary). We have organised our curriculum so that topics are revisited regularly and pupils who find specific concepts more difficult to grasp will be given extra support during, before and/or after lessons as capacity allows. Those who demonstrate a secure knowledge will be encouraged to "get going" independently at the beginning of the lesson. We nurture positive attitudes by matching the task to the child. We feel that successful learning enables children to develop confidence to meet the challenge of new work. To ensure a coherent approach to pupils' learning, account is taken of what each individual already knows. We model ways to apply learning to everyday situations and help children to develop this skill.

EYFS:

In FS1, Maths is taught through small adult-led groups and within daily routines such as tidy up time and in continuous provision. In FS2, a daily adult led teaching input is planned and delivered to ensure the development of knowledge and understanding in mathematical thinking towards Early Learning Goals. This is informed by the LEAD EYFS Curriculum Assessment document. A discrete 10 minute session using NCETM's Mastering Number resources (see following paragraph) is taught for 10 minutes four times each week. The concepts are reinforced with the children who haven't grasped them. Children continually access Maths provision, not only in taught sessions but through continuous provision, daily routines and games.

Across EYFS, teachers are following NCETM's Mastery Number Project, which is a large-scale nationwide programme that is designed to help children embed good number sense, including fluency and flexibility with number facts. As part of this, teachers deliver a daily session of 10 to 15 minutes in addition to their daily maths lessons. Resources, including lesson plans, visual resources and practical equipment (Rekenreks) are provided by the NCETM. In this project, attention is given to key knowledge and understanding needed in Reception classes, and progression through KS1 to support success in the future.

In FS2, there should be at least one direct teaching session observation or recorded mathematical learning. The observations should include a comment about what the child was learning, direct speech from the child and how the learning was extended or moved on. When recording is appropriate, either independent or adult-led, children will complete their learning on a piece of paper which will then have a slip with the short date, learning objective and success criteria attached onto it. The paper will be trimmed neatly and stuck into the child's Maths Learning Journal. Observations of mathematical learning in FS1 will be collected on Tapestry.

In EYFS, we use a mastery approach to teach Maths. We give all children lots of opportunities to experience and develop the 5 big ideas of mastery- coherence, variation, mathematical thinking, representation and structure and fluency. We use the NCETM learning trajectories to help us to plan lessons to ensure that teaching follows small steps which are progressive (coherence). We expose children to the same mathematical skills in lots of different ways (variation) such as different activities in provision, through daily routines and through songs and games. Children are given lots of opportunities throughout the day to consolidate and master their learning independently. Open-ended challenges are set for all children to allow them to investigate mathematical areas and develop their mathematical thinking. We believe that it is important to encourage children to progress at the same stage in order to prevent gaps in knowledge forming and so all children are taught the same mathematical skill, by offering extra support/an extension for number novices and number experts. Interventions are also planned and delivered to number novices to close gaps of previous ages and stages which have already developed. In EYFS, all practical Maths learning will be recorded as an observation on Tapestry.

In EYFS, all children are taught and exposed to fluency and reasoning. In EYFS, fluency means that children are efficient; and can choose the most efficient strategy, they are accurate; they know some things about number facts such as two numbers that make 5 or two numbers that make 8, and they are flexible; they are able to solve problems and realise there's more than one way. We also model and encourage all children regardless of whether they are a number novice or a number expert to explain their reasoning using stem sentences and give them lots of opportunities to do this.

In FS1 and FS2, medium term planning (MTP) is completed following the agreed EYFS template including links to Early Learning Goals and an outline of planned learning and enhancements. Short term planning (STP) will be completed weekly. This will include planning for the adult led focus, opportunities in provision and the adult's role in provision.

Key Stage 1:

In KS1, maths lessons last around 1 hour. Due to the wide ranging abilities and number of children with our KS1 cohort this year, we are currently streaming the children during the 2022-23 academic year across 3 groups/sets. Flipcharts are used in terms of introducing the teaching and learning of maths in KS1. They include models, diagrams, visual learning to aid conceptual understanding and deeper learning/memory. However, not all maths is taught through the smartboard. Children carry out practical learning tasks at tables, whiteboard work and work collaboratively in groups (with CT and TAs). Focus teacher-led groups are an integral part of teaching and learning in KS1.

In KS1, children use maths books with cm squares. They have a slip of paper stuck in at the start of every maths lesson with the short date, learning objective and success criteria. Children are encouraged to write one digit per square and present their work neatly. Key resources should be trimmed neatly and stuck into books. An emphasis should be placed on children recording directly in their books wherever possible rather than completing worksheets.

Alongside EYFS, KS1 are following NCETM's Mastery Number Project (see EYFS section for more information).

Key Stage 2:

In KS2, daily maths lessons last for (at least) 1 hour. Maths lessons follow the agreed Teach – Practise – Apply model sequenced effectively through Active Inspire flipcharts. Flipcharts are an integral part of teaching and learning at KS2 and include models, diagrams, visual learning to aid conceptual understanding and deeper learning/memory. (Please see agreed Maths planning monitoring document).

In Y3, children follow a similar approach to KS1 in terms of the same type of maths book, slips stuck in at the start of the lesson. Children are expected to work independently for longer which should be reflected in terms of productivity/work produced every lesson. In Y4, this is the same as above, except children write the date and

learning objective independently (where possible). In Y5 and Y6, children use smaller squares. A greater emphasis is placed on working independently and high expectations in regard to presentation (one digit per square, underlining, sticking in resources etc) are expected of all children.

In KS2, children complete a daily multiplication check to ensure that they can learn and retain key multiplication facts. These results are tracked by class teachers on a weekly basis. Children move onto the next times table after getting full marks for three consecutive weeks and they are completed in this order: x2, x5, x10, x3, x4, x8, x11, x6, x9, x12 and x7. In addition, TT Rockstars is a key maths initiative used from Year 2. TT Rockstars should be introduced in Y2 in-line with NC expectations (x2, x5, x10). In Y3, children to consolidate x2, x5, x10 and TT Rockstars used to support the teaching and learning of x3, x4 and x8. In Y3, children to consolidate x2, x5, x10, x3, x4, x8 and TT Rockstars to support the teaching and learning of x6, x7, x8, x9, x11, x12. In Y5 and Y6, TT Rockstars to consolidate/revisit all times tables to ensure children have quick recall (including variation.) Both Year 4 and Year 5 are following a comprehensive MTC programme to enable children to have quick and accurate recall of tables.

All children from Y1-Y6 have access to Mathletics (which is a successful and engaging online Maths learning platform). Mathletics will be used in lessons to provide additional challenges, as a key intervention resource and for homework tasks.

Across KS1 and KS2, MTP and STP follow the agreed templates. MTP includes the clear identification/blocking in of units including the lesson-by-lesson overview: Lesson number, Objective, Key idea (Small steps), Representation, Technical vocabulary and Resources. STP (usually flipchart or PowerPoint-based) includes a one-page teaching overview at the start of every flipchart/PowerPoint with the following overview: Learning objective, Success Criteria, Possible misconceptions/key questions, Teaching (Re-visit/Anchor task – Teach – Practise – Apply – Plenary). The clear STP overview at the start of every maths flipchart is given to TAs prior to the teaching of the lesson (in addition to a copy of the MTP for the next unit).

Mathematics pedagogy

1. Key principles of Mathematics lessons at Birley Spa:

At Birley Spa Primary Academy, we base mathematics on several key principles. These are:

- Lessons should inspire children to want to ask questions and to discover for themselves.
- Lessons are created to develop fluent thinkers who can spot more than one way to solve a problem and can critique their own and others' choices.
- High quality questioning is used the whole class and/or groups in order to challenge children's thinking at all levels.
- Partner talk is used so that children are expected to explain their thinking to their peers.
- Effective, clear teacher modelling gradually helps to guide children towards independence.
- Developing maths skills across the curriculum, for example creating and interpreting graphs in science, working with temperatures in geography and using number lines in history. Furthermore, Maths taught in context where possible and real-life opportunities made the most of in order that children can apply the maths in a real-life context.
- A focus on drawing attention to misconceptions, including 'true or false?' 'always, sometimes, never?' 'odd one out' discussions, teachers incorrectly modelling, children 'marking' work in order to identify whether it is correct. This list is by no means exhaustive.

When you walk into a Mathematics lesson at Birley Spa Primary Academy, you can expect to see the class working together on the same topic, whilst at the same time addressing the need for all pupils to master the

curriculum and for some to gain greater depth of proficiency and understanding. Challenge is provided by going deeper rather than accelerating into new mathematical content. Teaching is focused, rigorous and thorough, to ensure that learning is sufficiently embedded and sustainable over time. Long-term gaps in learning are prevented through pre teaching, effective, speedy teacher intervention and effective home learning. More time is spent on teaching topics to allow for the development of depth and sufficient practice to embed learning. Carefully crafted lesson design through the use of Active Inspire flipcharts/PowerPoints provides a scaffolded, conceptual journey through the Mathematics, engaging pupils in reasoning and the development of mathematical thinking. Teachers incorporate the following elements into every maths lesson:

- Teach
- Practice
- Apply (using Reasoning and Problem solving/Depth)

In this way, every child is given the opportunity to practice the new skill learnt and is presented with routine and non-routine problems to solve. Every lesson, children are given the opportunity to attempt a deeper learning challenge (when ready) and to present verbal and written explanations.

2. The Mastery Approach:

As a school, we use a 'mastery approach' towards mathematics teaching. Supported by the NCETM – Developing Mastery in Mathematics Document (2014), we ensure that:

- Teachers reinforce an expectation that all pupils are capable of achieving high standards in mathematics.
- The large majority of pupils progress through the curriculum content at the same pace. Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.
- A small step approach that makes connections between each learning step, and also makes connections between other areas of the maths curriculum.
- Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to foster deep conceptual and procedural knowledge.
- Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts in tandem.

3. Language in Mathematics:

Teaching and learning the language of mathematics is key for success in Mathematics. The pupils' mathematical vocabulary is a crucial part of their language development and their mathematical proficiency. Throughout school, children are expected to answer in full sentences in order to demonstrate active listening and model accurate mathematical statements. We use our Mathematics Working Walls to highlight key vocabulary/SLAM (Speak Like A Mathematician) throughout school. Teachers use the 'sentence support documents' created by our Maths practitioner from LEAD academy to support their planning. These documents include sentence scaffolds, sentence generalisations (definitions) and sentence stems. These sentence supports progress within each topic from EYFS to Year 6.

4. The use of Mathematics resources:

The use of Mathematics resources is integral to the concrete – pictorial – abstract approach and thus planned into our learning and teaching (please refer to our Calculation Policy for EYFS, KS1, Lower KS2 and Upper KS2

which can be found on our website in the Curriculum/Maths area.) The CPA approach should be utilised to deepen the understanding of the concept and exposure the structures of the Maths.

We have a wide variety of good quality equipment and resources, both tangible and ICT based, to support our teaching and learning. These resources are used by our teachers and children in a number of ways including:

- Demonstrating or modelling an idea, an operation or method of calculation, e.g. a number line; place value cards; dienes; money or coins; measuring equipment for capacity, mass and length; bead strings; the interactive whiteboards and related software; 3D shapes and/or nets.
- Numicon and related resources and software; multilink cubes; clocks; protractors; dice; number and fractions' fans; individual whiteboards and pens; and 2D shapes and pattern blocks, amongst other things.
- Enabling children to use a calculation strategy or method that they couldn't do without help, by using any of the above or other resources as required; and
- Providing a context, where possible and linking it to the application and practise of calculation strategies and number skills.
- Resources within individual classes are accessible to all pupils who should be encouraged to be responsible for their use.

All resources (including larger items shared by the whole academy) are located in the Mathematics area (located in the Dining Hall). Mathematics related software (apps) is also available, which children can access by using individual iPads or laptops (Mathletics and TT Rockstars).

Impact

The impact of this curriculum design will lead to outstanding progress over time across key stages relative to a child's individual starting point and their progression of skills. Children will therefore be expected to leave Birley Spa reaching at least age-related expectations for Mathematics. Our Mathematics curriculum will also lead pupils to be enthusiastic Maths learners, evidenced in a range of ways, including pupil voice and their work.

The school has a supportive ethos and our approaches support the children in developing their collaborative and independent skills, as well as empathy and the need to recognise the achievement of others. Students can underperform in Mathematics because they think they cannot do it or are not naturally good at it. Our Maths teaching and learning programme addresses these preconceptions by ensuring that all children experience challenge and success in Mathematics by developing a growth mindset.

1. Formative assessment:

Children receive effective feedback through teacher assessment, both orally and through written feedback, and AfL is integral to the design of each lesson. The structure of the teaching sequence ensures that children know how to be successful in their independent work. Guided practice, which provides further preparation for children to be able to apply the skills, knowledge and strategies taught during the 'Apply' phase is a key opportunity for common misconceptions to be addressed within the teaching sequence. Furthermore, essential understanding within each 'small step' is reviewed and checked by the teacher and the children before progression to further depth.

At the end of the lesson, the children review their work and self and peer assessment are used consistently as outlined by the school's 'Feedback and marking policy'. Where possible, the children are encouraged to indicate how confident they feel about their learning and identify next steps.

At the start of each blocked unit of work, the children complete the carefully aligned White Rose Maths 'Pre-assessment'. The outcome of this is used by the teacher to plan the new unit of work and ensure that any identified gaps in understanding are addressed through the sequence of planned lessons. Short term assessment is a feature of each lesson. Observations and careful questioning enable teachers to adjust lessons and brief other adults in the class if necessary. The lesson planning and structure at Birley Spa Primary Academy is designed to support this process and the Plenary task at the end of each lesson also allows for any further misconceptions to be addressed.

2. Summative Assessment:

Teachers administer a termly NFER arithmetic paper and reasoning and problem-solving paper which specifically links to the coverage for that term. The results of these papers are analysed through QLA (Question Level Analysis) and used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers at Parent's Evening. In Year 2 and Year 6, past SATs papers are administered every half term. The results of these papers are analysed through QLA as well in order to identify gaps in children's knowledge and confidence. These assessments are also used alongside the end of unit assessments and outcomes of work and teacher judgement to inform the whole school tracking of attainment and progress of each child.

Assessment data in maths is reviewed throughout the year to inform interventions and to also ensure that provision remains well-informed to enable optimum progress and achievement. End of year data is used to measure the extent to which attainment gaps for individuals and identified groups of learners are being closed. This data is used to inform whole school and subject development priorities for the next school year.