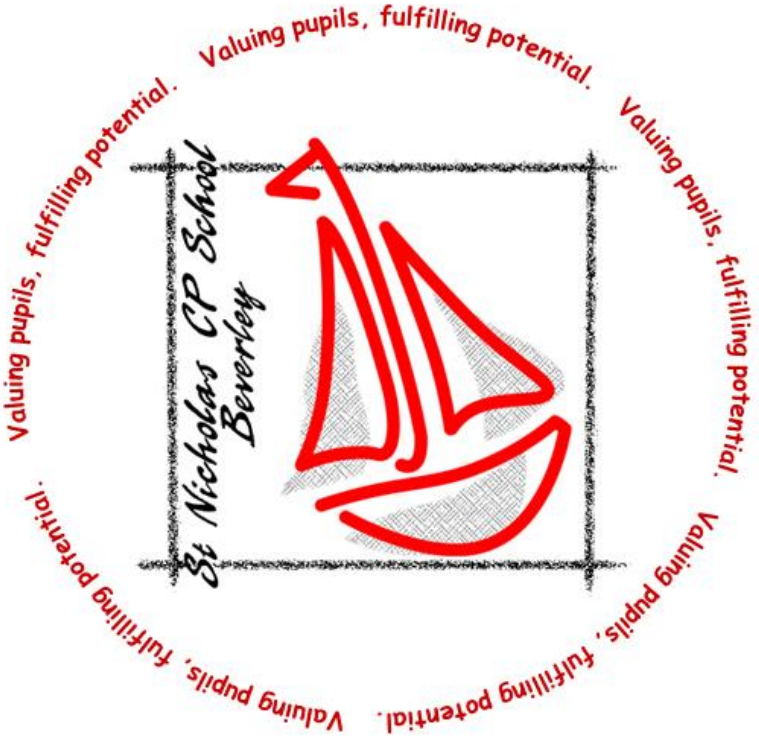
Beverley St Nicholas Primary School



Mathematics Policy

November 2020

1. Curriculum Statement

Intent

The 2014 National Curriculum for mathematics 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 Beverley St Nicholas Primary School, these skills are embedded within mathematics lessons and developed consistently over time. We are committed to ensuring that children can recognise the importance of mathematics 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. Every mathematics lesson features a real-life example of maths for children to see the relevance of what we are learning and how it can be useful to them. We want all children to enjoy mathematics and to experience success in the subject, with the ability to reason mathematically. We use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated problems. Children are provided opportunities to discuss maths with their peers in every lesson and as such, we are committed to developing children's curiosity about the subject, as well as an appreciation of the beauty and power of mathematics.

Implementation

The content and principles underpinning the 2014 mathematics curriculum and the mathematics curriculum at Beverley St Nicholas reflect those found in high-performing education systems internationally, particularly those of east and south-east Asian countries such as Singapore, Japan, South Korea and China. These principles and features characterise this approach and convey how our curriculum is implemented:

- Teachers reinforce an expectation that all children are capable of achieving high standards in mathematics.
- The large majority of children progress through the curriculum content at the same pace. Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.
- 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.
- Teachers use precise questioning in class to test conceptual and procedural knowledge and assess children regularly to identify those requiring intervention, so that all children keep up.

To ensure whole-school consistency and progression, the school uses the DfE approved 'Power Maths' scheme. This is fully aligned with the White Rose Maths scheme and the school's ongoing engagement with the DFE funded Maths Hubs programme continues to ensure that staff at all levels understand the pedagogy of the approach. New concepts are shared within the context of an initial related problem, which children are able to discuss using paired talk. This initial problem-solving activity prompts discussion and reasoning, as well as promoting an awareness of maths in relatable real-life contexts that link to other areas of learning. In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children may also use manipulatives in KS2. Teachers use careful questioning to draw out children's discussions and their reasoning. The class teacher then leads children through strategies for solving the problem, including

those already discussed. Independent work provides the means for all children to develop their fluency further, before progressing to more complex problems. Mathematical topics are taught in blocks, to enable the achievement of 'mastery' over time. Each lesson phase provides the means to achieve greater depth, with higher-attaining children being offered rich and sophisticated problems, as well as exploratory, investigative tasks, within the lesson as appropriate.

Impact

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 can't do it or are not naturally good at it. The Power Maths programme addresses these preconceptions by ensuring that all children experience challenge and success in mathematics by developing a growth mindset. Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child.

2. Teaching and Learning

A typical lesson using Power Maths lasts approximately 1 hour. Mathematics is taught daily during the morning. Children begin with a short 'Power Up' activity which supports fluency in and recall of number facts. Following this, the main lesson begins with a 'Discover' and 'Share' task in which a contextual problem is shared for the children to discuss in partners. This helps promote discussion and ensures that mathematical ideas are introduced in a logical way to support conceptual understanding. In KS1, these problems are almost always presented with objects (concrete manipulatives) for children to use. Children may also use manipulatives in KS2. Teachers use careful questioning to draw out children's discussions and their reasoning and the children learn from misconceptions through whole-class reasoning. Following this, the children are presented with varied similar problems which they might discuss with a partner or within a small group. At this point, scaffolding is carefully reduced to prepare children for independent practice. This is the 'Think together' part of the lesson and the children might record some of their working out in their maths books or on a mini whiteboard. The teacher uses this part of the lesson to address any initial errors and confirm the different methods and strategies that can be used. The children are then shown a 'challenge' which promotes a greater depth of thinking. The class then progress to the 'Practice' part of the lesson, which is designed to be completed independently. This practice uses carefully crafted conceptual and procedural variation to build fluency and develop greater 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. Children who complete this are provided with further 'rich and sophisticated' problems from a variety of sources including NRich, CGP Stretch materials and Deepening Understanding. The final part of the lesson sequence is a 'Reflect' task. This provides children with an opportunity to review, reason and reflect on learning and enables the teacher to gauge the depth of understanding of children.

3. Assessment

3.1 Assessment for Learning: Children receive effective feedback through teacher assessment, both orally and through written feedback; 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 takes place within the 'Think Together' part of the lesson, provides further preparation for children to be able to apply the skills, knowledge and strategies taught during the 'Discover and Share' phase. Common misconceptions are addressed within the teaching sequence and key 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. Self and peer assessment are used consistently as outlined by the school's 'Feedback Policy'.

3.2 Formative Assessment: 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 structure of Power Maths is designed to support this process and the reflect task at the end of each lesson also allows for misconceptions to be addressed. At the end of each blocked unit of work, the children also complete the carefully aligned White Rose Maths 'End of Unit Assessment'. The outcome of this is used by the teacher to ensure that any identified gaps in understanding can be addressed before the next unit is taught.

3.3 Summative Assessment: Teachers administer a termly arithmetic paper and reasoning and problem-solving paper which specifically links to the coverage for that term: these are provided by White Rose Maths. The results of these papers are used to identify children's ongoing target areas, which are communicated to the children, as well as to parents and carers. They are also used alongside the end of unit assessments and outcomes of work, to inform the whole school tracking of attainment and progress for each child in line with each 'fundamental' objective. 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. Termly pupil-progress meetings are held with every teacher in school. 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.

4. Planning and Resources

The use of mathematics resources is integral to the concrete – pictorial – abstract (CPA) approach and thus planned into teaching and learning. The school has a wide variety of good quality equipment and resources, both tangible and ICT based, to support our learning and teaching. 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. Resources for this purpose would include: a number line; place value cards; base 10; place value counters and grids; 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; calculators; 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

Standard resources, such as number lines, multi-link cubes, hundred squares and counters are located within individual classrooms. Resources within individual classes are accessible to all children who should be encouraged to be responsible for their use. Further resources (often larger items shared by the whole school) are also available as part of a central supply. An interactive teaching tool for the purpose of modelling strategies is available to all teachers as part of the Power Maths scheme. Resources to support teachers' own professional development and understanding of new approaches as part of a mastery approach are available on the Power Maths 'activelearn' platform. As well as overviews of learning, these include short videos which demonstrate new methods to ensure accuracy. High quality textbooks and practice books, approved by the DfE, as part of the national approach to teaching for mastery are used in each year group and a digital version of the Power Maths textbooks allows these to be shared with the class, during the main teaching. Teachers are encouraged to use the school playgrounds as an outdoor classroom when possible, for example, when teaching length, area or perimeter.

5. Organisation

The school has implemented a blocked curriculum approach to the teaching of mathematics (KS1 and KS2). This ensures that children are able to focus for longer on each specific area of maths and develop a more secure understanding over time. This approach is also designed to enable children to progress to a greater depth of understanding. Subsequent blocks continue to consolidate previous learning so that the children continually practise key skills and are able to recognise how different aspects of maths are linked. For example, when children have completed a block which has enabled them to master the multiplication of two-digit numbers, a subsequent block on area and shape might provide opportunities to use this understanding when calculating the area of shapes with 2-digit length and width dimensions.

6. EYFS

Research on children's learning in the first six years of life demonstrates the importance of early experiences in mathematics. An engaging and encouraging climate for children's early encounters with mathematics develops their confidence in their ability to understand and use mathematics. These positive experiences help children to develop dispositions such as curiosity, imagination, flexibility, inventiveness and persistence, which contribute to their future success in and out of school. **(Clements & Conference Working Group, 2004)**

Children in the Early Years Foundation Stage participate in direct maths teaching sessions 3X weekly.

Teachers provide pupils with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and describing shapes, spaces and measure **(Statutory Framework for the Early Years Foundation Stage, DfE: 2012).**

Mathematical concepts are taught using physical and pictorial resources, songs, games and role-play. Children are encouraged to communicate and explain their thinking as they interact with mathematics in 'deep and sustained ways'. To apply and practise their developing knowledge and skills, planned continuous provision provides resources both indoors and out as children seek to investigate their own fascinations. This structure to learning enables teachers to secure a good balance between whole class work, group teaching and individual practice. It also enables teachers to establish regular routines, thereby maximising teaching time and learning opportunities. Additionally, this approach supports assessment on a daily basis, as well as providing individual feedback to children to address misconceptions or to encourage opportunities to make wider connections between mathematical concepts and the world around them. Cross-curricular links with other subject areas are key connections to establish e.g. space, shape and measure and designing and making.

Within Foundation Stages 1&2 (Nursery and Reception), the independent activities found in the maths areas link to the focus for the week. For example, if the focus for the week is number recognition and addition, then activities in the maths area will link to this e.g. number tracks, number squares, counting resources, abacus, inset jigsaws, whiteboards and pens. Children also have the opportunity to self-select maths resources to consolidate their learning during child-initiated activities. We recognise the importance of play-based learning and therefore encourage children to develop their understanding and expressive language during their play.

Regular observations and assessments help to ensure that children that need additional intervention to consolidate their mathematical understanding are identified and supported by appropriate interventions.

Maths for young children should be meaningful. Where possible concepts should be taught in the context of real life.

7. KS1 and KS2

As acknowledged by the National Centre for Excellence in the Teaching of Mathematics (NCETM) and the Maths Hub programme – 'The use of well-designed and tested textbooks is critical for the successful implementation of teaching for mastery. A good textbook is both an aid for the teacher in planning lessons and for the children during lessons and working on their own.'

Through Years 1 to 6 we use a coherent programme of high-quality materials and exercises, which are structured with great care to build deep, conceptual knowledge alongside developing procedural fluency.

Our KS1 and KS2 teachers use textbooks and workbooks from DfE approved Power Maths series. This scheme is based on the principles of how Mathematics is taught in many high performing jurisdictions in East Asia and aligned with the 2014 National Curriculum. The Power Maths textbooks and workbooks are arranged in chapters and, over the course of the academic year, all units of the 2014 National Curriculum are covered. Teachers also plan activities and additional tasks which offer support and provide further challenge for children who are able to progress further in their learning.

Lessons in both key stages follow the same sequence (see section 2: Teaching and Learning). In addition to the teaching sequence, the teacher is encouraged to use 'mini-plenaries' to explain each question during the children's completion of the practice book and also to check children's understanding before they complete the next question. This ensures that all children are able to complete the task with confidence.

8. Equal Opportunities

The school is committed to ensuring the active participation and progress of all children in their learning.

All children will be given equal opportunities to achieve their best possible standard, whatever their current attainment and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation or the progress of which they are capable.

9. Inclusion

Taking a mastery approach, differentiation occurs in the support and intervention provided to different children, not in the topics taught, particularly at earlier stages. The National Curriculum states:

'Children 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.'

There is little differentiation in the content taught but the questioning and scaffolding individual children receive in class as they work through problems will differ, with higher attainers 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 support later the same day. A range of inclusion strategies are embedded in practice and teachers are aware of the special educational needs of the children in their class, as well as those who have English as an additional language. Although the expectation is that the majority of children will move through the programmes of study at broadly the same pace, the 2014 National Curriculum states:

'Decisions about when to progress should always be based on the security of children's 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, this will be overseen by the maths coordinator, SENDCo and Assistant Headteacher for Inclusion, in collaboration with the class teacher. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during SEND reviews.

10. Role of the Subject Leader

- The subject leader will raise the profile of mathematicss at Beverley St Nicholas Primary School through best practice. They will model lessons, as appropriate to new staff, NQTs and peers to support continued professional development. They will ensure the high quality of displays around the school, present certificates of achievement during assemblies and involve the school in 'celebrations' of maths, including participation in events such as 'World Maths Day'. The subject leader will support staff in providing opportunities for learning outside the classroom in maths and will identify and organise opportunities which enable this, as appropriate.
- The subject leader will monitor progression and continuity of maths throughout the school through lesson observations and regular monitoring of outcomes of work in maths exercise books.
- The subject leader will ensure that all staff have access to year group plans and the relevant resources which accompany them.
- The subject leader will monitor children's progress through the analysis of whole school data. They will use this data to inform the subject development plan which will detail how standards in the subject are to be maintained and developed further.
- The subject leader will, on a regular basis, organise, audit and purchase central and class-based maths resources.
- Through ongoing involvement in the DfE funded Maths Hubs programme, the subject leader will keep up to date on current developments in maths education and disseminate information to colleagues.
- The subject leader will extend relationships and make contacts beyond the school.
- The subject leader will develop opportunities for parents/carers to become more involved in maths education.
- The subject leader will ensure that all staff have access to professional development including observations of outstanding practice in the subject.

11. Parents

- The school recognises that parents and carers have a valuable role to play in supporting their child's mathematical learning. An overview of the maths curriculum is available on the school's website, as well as guidance in the progression in calculation methods used by the school. Paper copies of these documents are also available on request and the curriculum letter, sent home by each year group, also outlines the maths topics to be covered.
- Activities which link to each maths topic are suggested for parents and carers to try at home with their child in each Reception newsletter.
- Children are given maths home learning at least once a week from Year 1 to Year 6. Throughout the unit of work, maths home learning activities will be linked to the week's prior learning wherever possible.
- Parents are informed of their child's progress at Parent Consultation Evenings and this is also communicated in written school reports.
- Parents and carers are encouraged to speak to their child's teacher at any point during the year, either informally or by making a specific appointment. Information about their child's standards, achievements and

future targets in maths is shared during Parent Consultation Evenings, as well as ways that parents/carers may be able to assist with their child's learning.

- The school also provides a number of opportunities for parents/carers to learn about what their child is learning and the way their child is being taught through parent workshops.