Maths Policy

“You have filled my heart with greater joy” Psalms 4:7

Approved by:	Jo Trahearn	**Date:**
Last reviewed on:	January 2022	
Next review due by:	January 2024	

Aims from the National Curriculum

Mathematics is a creative and highly interconnected 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.

National Curriculum 2014

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

Maths Intent Statement

'Mathematics is the language in which God has written the universe.'
Galileo Galilei

Maths is a creative and highly interconnected discipline which is essential to everyday life, critical to science and technology, and necessary for financial literacy. At Ashby C of E Primary our intention is **t*o develop confident, 'can do' mathematicians, who can reason, problem-solve and apply their knowledge and skills across a range of contexts in the real world.***

At Ashby C of E we believe that children should experience consistency in the approach to quality teaching of mathematics as they move through the school so they;

- *Build progressively on their existing knowledge and understanding*
- *Understand the links in their learning*
- *Gain automaticity in key number facts*
- *Articulate their understanding clearly*
- *Calculate and solve numerical problems confidently and efficiently*

Essentially, our ethos is that **all** children can be successful in the study of mathematics. We do not accept that 'some children cannot do maths.' Maths is for everyone and we teach the skills to ensure our children are resilient learners who become life-long Mathematicians.

The intention of the Maths curriculum at Ashby C of E Primary is for children to be excited about Maths! Developing a positive attitude to this subject is essential. Teachers promote children's enjoyment of Maths and provide opportunities for children to build a conceptual understanding of Maths before applying their knowledge to everyday problems and challenges. We ensure that challenge is provided for all children, whatever their understanding. Children are encouraged to be brave and push the boundaries, deepening their understanding further.

We aim to deliver an inspiring and engaging Mathematics curriculum through high quality teaching.

Our Mastery Journey

In September 2018, Ashby C of E Primary School transitioned towards a Mastery approach to the teaching and learning of mathematics. We understand that this will be a gradual process and take several years to embed. The rationale behind changing our approach to teaching mathematics lay within the NCETM Maths Hub Programme, as well as the 2014 National Curriculum, which states:

- the expectation is that most pupils will move through the programmes of study at broadly the same pace;
- 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.

The only way to learn Mathematics is by doing Mathematics!

In order to improve our mastery approach and ensure consistency and progression across the school, we decided to implemented the DfE approved Power Maths scheme for Year 1 to 6 from September 2019. The scheme fully supports a mastery approach and rejects the notion that some people simply 'can't do maths.' Instead it develops growth mindsets and encourages hard work, practice, collaboration and a willingness to see mistakes as learning tools. The Power Maths approach enables children to be numerate, creative, independent, inquisitive, enquiring and confident and if taught with expertise and consistency should promote a deep, long-term, secure and adaptable understanding of the subject, so that our children become fluent in calculations; possess a growing confidence to reason mathematically and hone their problem-solving skills.

IMPLEMENTATION

Curriculum Design

At Ashby C of E Primary, we recognize that children need to be confident and fluent across each yearly objective. To ensure consistent coverage, teachers from Year 1 to Year 6, follow the Power Maths scheme of learning to support their planning. For each year, the curriculum is broken down into core concepts, taught in units. A unit divides into smaller learning steps – lessons. Step by step, strong foundations of cumulative knowledge and understanding are built. In addition, Teachers are further developing their understanding of mastery whilst working with the Maths Hub and through regular in house CPD.

Lesson Structure

Each year group has a 50 min - 1 hour Power Maths lesson per day and in addition delivers two 10-15 min Maths Meetings weekly and a Flashback Friday Session . The aims of these additional sessions are to ensure retention of mathematical concepts & vocabulary, increase fluency, consolidate gaps and accelerate progress.

Daily Power Maths lessons are divided into sections that involve plenty of discovery, sharing, thinking together, practice and reflection.

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 will use manipulatives in KS2. Teachers use careful questions 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. Each child will have their own Powermaths Practice book, there are 3, A, B & C (One per term typically). This practice uses 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.

The final part of the sequence is a ‘reflect’ task. This is an opportunity for children to review, reason and reflect on learning and enables the teacher to gauge their depth of understanding.

Children are encouraged to solve problems each day through the use of concrete resources, pictorial representations and abstract thinking. In addition to each child having their own Powermaths Practice Book in which they answer questions and discuss their thinking with their teacher they will also have an additional Maths exercise book. Teachers will use their professional judgement to support mathematical learning and where additional practice of a concept is needed will teach and set work to complete in exercise books. Powermaths allows teacher the flexibility to deliver additional lessons to compliment, re-enforce and embed learning. Teacher will supplement Powermaths using additional resources from the NCETM Prioritisation materials and White Rose Maths resources. These align with Powermaths ensuring consistency in the representations and mathematical structures and procedures taught.

At the heart of this programme is the idea that all children can be successful mathematicians with the right mind-set. Children learn alongside five characters, each with different mathematical characteristics. These characters are:

High quality resources are used in conjunction with Power Maths, such as NRich and NCETM support documentation such as Curriculum Prioritisation in Primary Maths, to support, stretch and challenge all children within the classroom.

Our curriculum builds on the concrete, pictorial, abstract approach. By using all three, the children can explore and demonstrate their mathematical learning. Together, these elements help to cement knowledge so children truly understand what they have learnt. All children have access to a wide range of concrete mathematical resources to help their understanding the underlying structures of mathematical concepts.

All children when introduced to a new concept for the first time are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols. Throughout Ashby C of E Primary, you will see these three methods being used:

Concrete – children have the opportunity to use concrete objects and manipulatives to help them understand and explain what they are doing.
Pictorial – children then build on this concrete approach by using these pictorial representations, which can then be used to reason and solve problems.
Abstract – with the foundations firmly laid by using the concrete and pictorial methods the children can move onto an abstract approach using numbers and key concepts with confidence.

Teachers teach maths using the online interactive tools, enabling them to model pictorial and abstract concepts which children can replicate and apply to their own learning.

Early Years Foundation Stage

At Ashby C of E Primary school we use the Early Years Foundation Stage (EYFS) Development Matters guidance to support children's mathematical learning and development. By the end of the Reception year children are expected to reach the Early Learning Goals (ELG) as outlined in the EYFS Statutory Framework (2021)

Mathematics ELG:

ELG Number

Children at the expected level of development will: -

- Have a deep understanding of number to 10, including the composition of each number;
- Subitise (recognise quantities without counting) up to 5;
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

ELG: Numerical Patterns

Children at the expected level of development will:

- Verbally count beyond 20, recognising the pattern of the counting system;
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Children in EYFS explore mathematical concepts through active exploration and their everyday play-based learning. Children are taught key concepts and develop number sense using a multi-sensory approach, where children can physically learn and touch objects in their maths' play. EYFS practitioners provide opportunities for children to manipulate a variety of objects, which supports their understanding of quantity and number.

The CPA (concrete, pictorial, abstract) approach is used when teaching children key mathematical skills. Practitioners allow children time for exploration, and the use of concrete objects helps to support children's mathematical understanding. Mathematics

in the early years provides children with a solid foundation that will enable them to develop skills as they progress through their schooling, and ensures children are ready for the National Curriculum. EYFS practitioners introduce representations such as five & tens frames, double sides counters, beadstrings, part-part whole models etc to ensure consistency of model and images which will support children with the transition to Powermaths in Key Stage 1.

Fluency of Number Facts

All Reception & Key Stage One children have a Numberbots account and are encouraged to engage regularly at home, as well as in school. Teachers monitor children's engagement and reward children's efforts through stickers, certificates and postcards. All children from Y1-Y6 have a Times Table Rockstars account and are encouraged to engage regularly at home, as well as in school. TTRockstars is fundamental in developing children's fluency, and helps prepare children for the Year 4 Multiplication Tables Check which is statutory from Spring 2022. To raise the profile of TTRockstars, Ashby C of E Primary participate in National Competitons such as 'England Rocks' and organises regular tournaments between classes as well as whole school Maths weeks where children dress as Rock stars and compete against each other during assemblies. In addition a leaderboard is displayed in the main school hall celebrating both children with the Highest Rock Speeds and also the Highest Number of Coins Earnt.
Finally, teachers regularly chant times tables during spare moments of the day to increase fluency.

Resources

The use of Mathematics resources is integral to the concrete – pictorial – abstract approach and thus planned into teaching and learning. Ashby C of E 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: ten frames and place value counters; number lines; place value cards; dienes; bead strings; multilink cubes; money or coins; measuring equipment for capacity, mass and length; 3D shapes and/or nets; clocks; protractors; calculators; dice; number and fractions' fans; individual whiteboards and pens; and 2D shapes and pattern blocks, amongst other things

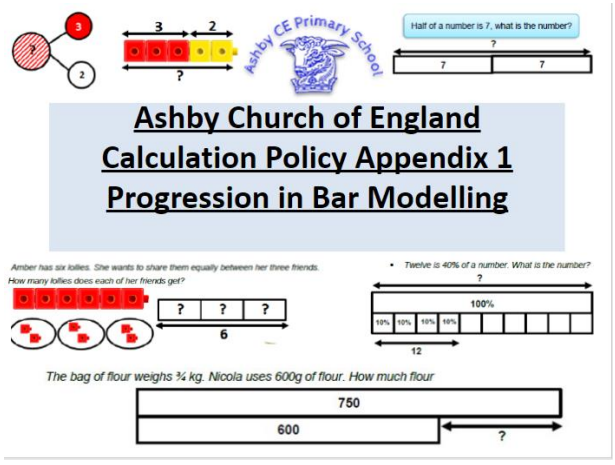
- Enabling children to use a calculation strategy or method that they couldn't do without help, by using any of the above or other resources as required

Standard resources, such as number lines, multi-link cubes, ten frames and place value counters, dienes, hundred squares are located within individual classrooms. Resources within individual classes are accessible to all children who should be encouraged to be responsible for their use.
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.

Calculation Policies

Our school's calculation policies are used to ensure a coherent approach to teaching the operations across our school. They are aligned with the Power Maths Mastery Scheme to ensuring consistency and progression in calculation (addition, subtraction, multiplication and division). Each policy demonstrates how the use of the CPA (concrete, pictorial, abstract) approach helps children develop mastery in both written and mental methods across all the operations in an efficient and reliable way. In addition, Appendix 1 Progression of Bar Modelling supports teachers to effectively build in bar modelling to support children to unpick the mathematical structure in order to identify the calculations required to solve a given problem.



Cross Curricular

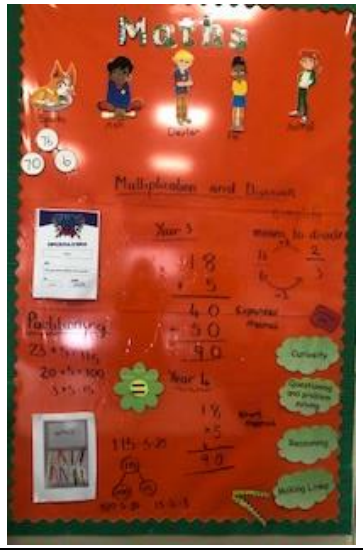
At Ashby C of E Primary, teachers plan strategically to take advantage of opportunities to make cross curricular links. They will plan for pupils to practice and apply the skills, knowledge and understanding acquired through Maths Lessons to other areas of the curriculum.

Examples of cross curricular learning could include:

Department	Mathematical content
Art	Symmetry; other transformations; paint mixtures as a ratio
Geography	Representing data; finding averages; use of spreadsheets
History	Timelines; sequencing events
Digital Literacy	Collecting and representing data
MFL	Dates; counting in other languages
PE	Collecting real data; timing; measuring
Science	Formulae; calculating means and percentages; calculating with positive, negative and decimals; substitution; rearranging formulae; collecting and representing data.
DT	Measurement; properties of shape; scaling and ratio.
English	Identifying important information in a text will help them to better understand problem solving questions.
Music	Sequencing

Maths Environment

All classrooms are expected to have an up to date Maths Working Wall which reflects the current Power Maths Unit and is built up over time with the children. On display may be relevant key vocabulary, concrete, pictorial and abstract methods and STEM sentences. Whole School Maths displays will be produced in communal areas around the school, led by the Maths Subject Lead.



Homework

At Ashby C of E, Maths homework is set weekly in Year 5 / 6 and fortnightly for the rest of the school on Seesaw. This will usually be in the form of a consolidation activity based upon recent in class learning. Teachers will ensure children complete home learning regularly and provide feedback. Where children do not engage in home learning the class teacher will identify reasons for lack of engagement and work with child and parents to overcome the difficulties. This may include providing the child with a suitable device for home learning or offering the opportunity to attend a homework club. In addition to the Seesaw activity, children should be regularly practicing their fluency of number facts. To support this, Reception, KS1 and KS2 children identified with a need have access to Numberbots and Year 2-Year 6 have access to Times Table Rockstars.

Inclusion

By taking a mastery approach at Ashby C of E Primary, differentiation occurs in the support and intervention provided to different children, not in the topics taught. 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 accelerating 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.

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 directed by the SENDCo, in collaboration with the class teacher and with the knowledge of the Maths Subject Lead. Specific arrangements for the provision of children with SEND will be communicated to parents and carers during termly SEND Structured Conversations, using provision map.

Equal Opportunities

At Ashby C of E Primary School we are 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.

Assessement

Formative assessment

Assessment for Learning (AfL) is a key feature of each lesson. Observations and careful questioning enable teachers to adjust lessons and brief other adults to provide support where needed. 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.

Summative assessment

At the end of each blocked unit of work, the children also complete the '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.
In addition, Teachers administer a **Termly NTS Mathematics Assessment** which tests arithmetic, reasoning and problem-solving. The results of these papers are entered into Mark to track individual, class and cohort progress and attainment as well as to identify any gaps in learning. Personalised reports, showing individual children's strengths and weaknesses can then be created and used to inform dialogue with parents and carers during parents' evenings.

At the end of each term, teachers will use the above assessment data alongside their professional judgement as to the extent a child has demonstrated mastery of each 'fundamental' objective, to decide whether a child is working towards, at or above age related expectations.

These Termly Teacher Assessments are then entered into the Whole School Tracking System and analysed by the Senior Leaders. At the beginning of each term children's attainment, progress and barriers to learning will be discussed in Pupil Progress Meetings with Senior Leaders and clear actions to work on will be planned together, to support pupils and staff in closing gaps.

In addition, the Maths Subject Lead is responsible for analysing the data throughout the year to inform interventions and to also ensure that provision remains well-informed to enable optimum progress and achievement.

Deep analysis of the 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.

Monitoring and Evaluation

The Maths Subject Lead plays an active role in the school self-evaluation cycle and throughout the year they will participate in:

- Ensure there is clear progression throughout the school
- Creation of termly data reports
- Reporting to SLT & Governors
- Pupil voice
- Work samples
- Learning Walks
- Developing cultural capital opportunities and events
- Identify any training needs and offer extra support and guidance to staff when it is appropriate
- Ensure that there are suitable resources to help with the teaching and learning of their subject

Review

This mathematics Policy will be reflected in our practice. The policy will be reviewed annually.

Agreement Date of Policy

This policy was developed by the Maths Subject Lead in January 2022

IMPACT

Embedding a Mastery approach to Mathematics supported by Power Maths is helping to address some children's preconceptions that 'they can't do maths.' Through developing a growth mindset, children are becoming more resilient and enjoying success in mathematics. Regular and ongoing assessment informs teaching, as well as intervention, to support and enable the success of each child. These factors ensure we are able to maintain high standards, with achievement at the end of KS2 above the national average and a higher proportion of children demonstrating greater depth, at the end of each phase.

(See Termly Maths Data Analysis and Pupil Surveys)

Appendices

Planning Information		
Maths Curriculum Maps	Ashby C of E Key Vocabulary (Year 1- 6)	Ashby C of E Stem Sentences
Maths Yearly Overviews	Key vocabulary	Stem Sentences

Written Calculation Policies			
KS1 Maths Calculation Policy	LKS2 Maths Calculation Policy	UKS2 Maths Calculation Policy	Bar Modelling Progression Document
KS1 Calculation Policy	LKS2 Calculation Policy	UKS2 Calculation Policy	Bar Modelling Progression Document

Parent Information		
Powermaths Presentation for Parents	TTRockstars for Parents	Numberbots For Parents