The Grange Primary School

Maths Policy

2023-2024

Lead: A. Chowdhury
To be reviewed each Autumn term

PURPOSE

• To provide a framework to enable teachers to meet their statutory obligations with regards to the teaching of mathematics.
• To provide a consistent approach throughout the school to mathematics.
• To foster a love of mathematics by providing pupils with meaningful experiences.
• To provide procedures for planning and record keeping ensuring continuity and progression throughout the school
• To meet the National Curriculum requirements

AIMS (Intent)

The aims of The Grange Primary School reflect those of the 2014 National Curriculum for maths, which are that children:

- 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.

Our approach to teaching mathematics also aims to:

- Foster a deep comprehension of mathematics by systematically instructing relevant learning goals.
- Promote the practical application of mathematics as a versatile tool in various school activities and later in adult life.
- Enhance children's capacity to articulate their thoughts fluently, discussing the subject confidently while employing accurate mathematical literacy.
- Cultivate the capacity to think clearly and logically, promoting independent thought and adaptability of thinking.
- Cultivate mathematical skills, knowledge, and rapid recall of fundamental facts.

PROGRESSION THROUGH THE CURRICULUM

By the end of Year 6, children are expected to be 'Secondary ready'. To achieve this, children not only need to be fluent in their knowledge and recall of mathematical facts, but they also need to be competent and confident in reasoning, investigating concepts and applying them to solve problems. When they are able to do this at their stage expectation, they are then considered by the teacher to be fully secure in their knowledge and understanding at that stage.

The expectation is that the majority of children will move through the curriculum at broadly the same pace. However, decisions about when to progress should always be at the discretion of the teacher and based upon assessments regarding the security of pupils' understanding. Pupils who grasp concepts quickly should not be accelerated onto the next stage of the maths curriculum content. Rather, they should be challenged through rich and sophisticated problems across a broader range of contexts. Those who are not sufficiently fluent in earlier material should consolidate their understanding through targeted intervention and support.

The National Curriculum 2014 is designed as a year by year programme of study. At The Grange Primary, we call these 'Stages' of learning. The year 1 programme of study therefore is named 'Stage 1' and so on.

We assess children using the content and concepts at each stage of the curriculum. We also assess children's skills in reasoning with these concepts and their ability to use them to investigate, solve problems and apply them across the curriculum.

We split each stage into 4 sub-stages to assess where the children are working within the curriculum. Children can be working within a stage at either: emerging, developing, securing or mastering. Children who are secure at their stage will have an understanding of the mathematical concepts and will be working on more complex problem solving and on the application of these skills. They will also be dedicated peer coaches to support other children with their learning.

For more information on the National Curriculum 2014 and the expectations for each year group, please visit the Government website: https://www.gov.uk/government/publications/national-curriculum-in-england-mathematics-programmes-of-study

The maths section of the Grange Primary School website also has details of expectations stage by stage: https://www.tgps.uk.com/maths/

Maths in the Foundation Stage:

Starting in September, all children in Foundation 2 will commence their journey of teacher-led and whole-class learning, striking a balance between adult-supported and independent activities. We provide ample opportunities for children to apply and enhance their foundational mathematical knowledge, skills, and comprehension through purposeful play, incorporating well-thought-out elements of numbers and numerical patterns into their activities. The primary planning tool for the Foundation Stage is the White Rose Maths Early Years resources, with FS2 educators integrating opportunities for children to grasp mathematical concepts in a contextually meaningful environment.

Our learning objectives are derived from the Development Matters Statements outlined in the Early Years Foundation Stage document. We regularly assess children's progress, using this information to tailor future plans to meet their specific needs. Through purposeful play, our students engage in immersive learning experiences that help them make sense of the world around them. They actively explore and refine their ideas, fostering creativity in collaboration with their peers. They also engage in problem-solving activities that promote effective communication.

In the Foundation Stage, we facilitate free-flow transitions between indoor and outdoor learning spaces, which significantly benefit children's development. The outdoors offer opportunities for children to practically apply and explore mathematical concepts, such as through activities like construction and gardening.

Assessment in Maths – Foundation Stage

Our assessment practices in the Foundation Stage encompass both formal and informal observations, meticulously recorded on platforms like Tapestry and Classtrack. We maintain close collaboration with parents and carers to support children's learning and development. They have opportunities to engage with our staff regarding their child's progress and gain access to the Tapestry platform. Additionally, FS2 teachers set focused Rainbow Challenges related to the mathematics curriculum where children are rewarded with rainbow beads upon successfully achieving their target. In the Summer term, the EYFS profile should be completed for each child (June), assessing pupils' readiness for Year 1. Our transitional approach in mathematics concentrates on mastering the Early Learning Goals, preparing our pupils for the Year 1 curriculum.

Maths in Key Stage 1

The principal focus for teaching mathematics in Key Stage 1 (KS1) in the context of the National Curriculum (NC) for England is to establish a strong foundation in key mathematical concepts and skills. The key areas of focus in KS1 mathematics include:

- Number and Place Value: Developing a deep understanding of numbers up to 100, including counting, reading, and writing numbers. Children should also learn about place value, comparing and ordering numbers, and recognising odd and even numbers. A solid grasp of number bonds to 10 and 20 is crucial.
- Addition and Subtraction: Building mental strategies for addition and subtraction, using concrete materials, pictorial representations, and written methods. Developing fluency in basic addition and subtraction facts is essential.
- Multiplication and Division: Introduction to multiplication as repeated addition and division as sharing and grouping. Learning and applying multiplication and division facts are important, with an emphasis on the 2, 5, and 10 times tables.
- Measurement: Understanding and using appropriate units for measuring length, mass, capacity, and time. Comparing and ordering measurements and solving simple measurement problems are key skills.
- Geometry: Recognising and describing 2D and 3D shapes, as well as understanding their properties. Exploring position and direction, including concepts like left and right, above and below, and compass directions.
- Statistics: Collecting and organising data, representing data using graphs, charts, and tables, and interpreting data to draw conclusions.

Teachers use a range of teaching strategies, including concrete materials, visual aids, and hands-on activities, to ensure that pupils grasp these concepts effectively. Moreover, pupils are encouraged to engage in problem-solving activities and mathematical discussions to promote critical thinking and reasoning skills.

It is important to note that in addition to the content areas mentioned above, there is also a strong emphasis on developing mathematical fluency and a positive attitude toward mathematics. Teachers aim to instil confidence in pupils' mathematical abilities and promote a growth mindset, encouraging them to persevere through challenges and view mistakes as opportunities for learning. They strive to incorporate the mastery approach which is supported by using the CPA approach (concrete, pictorial and abstract) to teaching mathematics.

We collectively aim to provide a well-rounded mathematics education for students in Key Stage 1, setting the stage for continued mathematical development in Key Stage 2 and beyond.

Maths in Key Stage 2

The principal aim of teaching mathematics in Key Stage 2 (KS2) in the context of the National Curriculum (NC) for England is to build upon the foundational knowledge and skills developed in Key Stage 1 (KS1) and to further deepen pupils' understanding of mathematical concepts. In KS2, the focus broadens to encompass more advanced mathematical topics, problem-solving, and mathematical reasoning. Teachers in Key Stage 2 continue to employ the mastery and CPA approach to teaching mathematics and use the White Rose Maths scheme to support planning.

The principal aims for teaching mathematics in KS2 include:

- Developing mathematical fluency: Continue to develop pupils' fluency in core mathematical operations, including addition, subtraction, multiplication, and division. This includes mastering multiplication tables and applying these skills to more complex calculations.
- Deepening understanding: Deepen pupils' understanding of fundamental mathematical concepts, such as place value, fractions, decimals, and percentages. Ensure that pupils can manipulate numbers and concepts with confidence.
- Problem-solving: Encourage pupils to apply their mathematical knowledge to solve a wide range of problems, including real-world scenarios. Promote problem-solving strategies and critical thinking skills.
- Mathematical reasoning: Develop pupils' ability to reason mathematically, explain their thinking, and justify their solutions. Encourage them to use mathematical language accurately.
- Geometry and measurement: Explore more advanced geometry concepts, including angles, properties of shapes, and coordinates. Develop measurement skills in more complex contexts.
- Statistics: Introduce pupils to statistical concepts, including data representation, interpretation, and drawing conclusions from data. Extend their knowledge of probability.
- Algebraic thinking: Introduce algebraic concepts, including using symbols, expressions, and simple equations to represent mathematical relationships.
- Mathematical vocabulary: Expand pupils' mathematical vocabulary to ensure they can articulate and communicate mathematical ideas effectively.
- Mathematical confidence and independence: Foster confidence in pupils' mathematical abilities and encourage them to work independently on mathematical tasks and investigations.

- Assessment and monitoring: Regularly assess pupils' progress to identify areas for improvement and provide targeted support.
- Cross-curricular links: Explore opportunities to integrate mathematics into other subjects and demonstrate the real-world relevance of mathematical concepts.
- Mathematical resilience: Cultivate resilience in pupils to tackle challenging problems and persevere in their mathematical endeavours.

Overall, the principal aim of teaching mathematics in KS2 is to equip pupils with a solid foundation in mathematical skills, knowledge, and problem-solving abilities that will not only serve them academically but also in their everyday lives. It aims to foster a positive attitude towards mathematics and prepare pupils for the more advanced mathematical concepts they will encounter in later stages of their education.

PLANNING (Implementation)

To provide adequate time for developing key skills in fluency, reasoning and problem solving, each class teacher will provide at least five daily mathematics lessons per week one of which is dedicated to reasoning and problem solving. Additional mathematics is taught during early bird activities and further opportunities are implemented during unstructured times to enable pupils to rehearse half-termly KIRFS. An additional block of 15 minutes daily is dedicated to arithmetic practice and is tailored to the needs of the class. E.g. in KS1 this time has been dedicated to delivering the Mastering number program. In KS2, staff use this as an opportunity to revisit prior learning but also to pre-teach concepts.

Class teachers provide high quality maths lessons ensuring that there is emphasis on direct whole-class teaching, groups/partner work and independent work. All pupils, when introduced to a key new concept, should have the opportunity to build competency in this topic by using the CPA approach.

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

Staff model and encourage pupils to use the correct mathematical language by providing sentence stems. This scaffolds students in articulating their answers and also in practising their reasoning skills . Teachers follow the long term plans on White Rose Maths and are encouraged to create lessons using a variety of resources, including the White Rose Maths Scheme of Learning, NCETM, NRICH and Testbase. A typical mathematics lesson aims to empower all pupils, regardless of their abilities, to become confident and adept learners. Our dedication lies in building upon their prior knowledge and enabling them to showcase a profound, conceptual grasp of each subject, which they can refine over time.

Pupils are motivated to develop proficiency in recalling essential facts, and a school-wide approach to teaching calculation strategies is deployed through the school. (Please refer to the calculation policy.) We explicitly teach reasoning and problem-solving skills weekly to equip students to be independent learners who are prepared to take risks.

The teaching of multiplication facts continues to be a discrete focus, where the applications of these skills are essential for accessing other areas of mathematics. To make the learning relevant, cross-curricular links are made wherever possible and children are encouraged to apply skills from all areas to complete real-life challenges and give learning a sense of purpose.

The typical structure of a Maths lesson consists of the following elements:

Part	Details
Respond to feedback (5 Minutes)	ABC (adult support, buddy/corrections or challenge) Tasks should not be extensive.
Recap prior learning (5-10 Minutes)	This could be a combination of learning from the previous day/week/unit(s)/year- it does not need to directly feed into the current lesson and is an oppo against previous objectives. Approximately 5 questions.
Main lesson input (15-20 mins)	**This will involve guided practice using the CPA approach.** ● Ping ponging questions. ● Utilise whiteboards for afl. ● KAGAN structures to incorporate collaborative learning. ● ABC (accept, build, challenge) to be used as part of teacher questioning. ● Utilise visualiser.
Independent tasks (20 minutes)	Fluency questions and reasoning questions should be included within chilli challenges as appropriate. Worksheets should be only used when it is absolut the opportunity to draw the models they need. **CC1** should be the scaffolded version of CC2. (This could be via resources, pictorial structures, information already provided, appropriate numbers etc) **CC2**: Should be aimed at pupils working at ARE.

	CC3: Should be the one that poses more challenge. (e.g. missing numbers, prove it) **SB:** Could be peer coaching or accessing challenge boxes. If pupils are not able to access the scaffolded chilli challenge, alternative work around the topic should be provided.
Plenary **(10 minutes)**	● Marking stations to be used if flashmarking has not already taken place within the lesson. ● Summarise lesson- how confident do you feel with x? Pupils self assess their understanding against the LO. ● Future learning.

Teaching Calculation

The Grange Primary School follows the formal written methods recommended by the 2014 National Curriculum Expectations. A detailed calculation policy has been adopted from Power Maths (in association with White Rose Maths) to ensure progression within mental and written calculation methods across the school. This is available to view in the policy section of the Maths area on the school website.

In EYFS and Key Stage One, the foundations are laid for the key concepts that underpin calculation. Beginning with counting on and counting back, children then progress on to understanding wholes and parts. This will enable them to calculate efficiently, accurately and with greater flexibility. They learn how to use an understanding of 10s and 1s to develop their calculation strategies, especially in addition and subtraction.

In Years 3 and 4, children develop the basis of written methods by building their skills alongside a deep understanding of place value. They should use known addition/subtraction and multiplication/division facts to calculate efficiently and accurately, rather than relying on counting. Children use place value equipment to support their understanding, but not as a substitute for thinking.

In upper Key Stage 2, children build on secure foundations in calculation, and develop fluency, accuracy and flexibility in their approach to the four operations. They work with whole numbers and adapt their skills to work with decimals, and they continue to develop their ability to select appropriate, accurate and efficient operations.

Differentiation

The majority of children will move through the curriculum at broadly the same pace. More-able pupils who grasp concepts quickly are challenged through rich and sophisticated problems in different contexts across the curriculum and through peer mentoring. SEN-D children and those who are not sufficiently fluent in earlier material will consolidate their understanding through the chilli challenges in class, same day intervention and appropriate intervention before moving on.

To support differentiation, a WILF should be planned as to how to achieve the LO. This should be created each lesson and be differentiated as appropriate to the chilli challenge. Task, questioning and support should be appropriate to the needs of all pupils including SEN-D, EAL and G&T. A range of both open and targeted questioning should be evident and included in planning each lesson. Questioning should encourage thinking and explaining (puzzles and problem solving). VAK teaching strategies should be employed throughout the week to cater for all learning styles.

More-able children should be challenged through application to a broad variety of contexts across the curriculum and through peer coaching. Pre-teaching by the class teacher should take place where applicable to support children in accessing the learning in class and also to challenge the more-able pupils.

Assessment in Maths: Key Stages 1 and 2

At the end of Year 6, children are assessed against the National Curriculum requirements through SATs. Teachers use past SATs papers regularly to assess progress and attainment. Pupils in Year 4 complete an online multiplication tables check (MTC) in June where pupils will be asked 25 questions on the 2-12 times tables. It is crucial that pupils are fluent in their times tables.

Teacher assessments are ongoing throughout Key Stages 1 and 2. Assessments are supported by classtrack, Testbase termly arithmetic/reasoning tests, half-termly KIRFS and weekly times tables tests. Class teachers upload end of term assessment data onto Otrack which is then used analysed by the Maths leader. Termly pupil progress meetings also support identifying intervention requirements and strategies in diminishing gaps.

Class targets are set based on the topic being covered. When pupils achieve their target, they are awarded a blue rainbow bead.

Marking and feedback

Flash-marking is used to provide immediate feedback for pupils. This enables them to celebrate their successes and address any misconceptions, allowing them to steer their learning forward. Where misconceptions have been identified, pupils are provided with same day intervention to diminish the gaps. In addition to flash-marking, feedback should provide pupils with their next steps/challenges which will be evident in pupils' books. Marking should adhere to the school marking and feedback policy.

British Values

The maths curriculum promotes the British Values of tolerance and resilience through problem solving and understanding of complex concepts. Children are required to persevere to solve problems. Teamwork is central to maths through peer assessment, mentoring and group work. Mutual respect is developed as children work together and build confidence in one another. Children can feel safe to make mistakes and take risks in problem solving, thus developing self-confidence and esteem. Children are encouraged to become life-long learners alongside developing their mathematical skills across the

curriculum through enterprising and problem solving. Each year group has a maths subject representative in Key Stages 1 and 2. These subject representatives work with the maths leader in developing Maths across the school which also promotes British values.

Monitoring and Review

There is dedicated subject monitoring time spread across the academic year. Monitoring involves lesson observations, planning and book scrutiny, monitoring of the staff non-negotiables, pupil interviews and termly data analysis. A report is produced and submitted to the governors and headteacher. Staff are provided with both general feedback and individual feedback and supported according to their needs.