



Greystoke
Primary School

Work Hard. Be Kind.

Mathematics Subject Policy

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Gardner**

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Rationale

This policy outlines the intent, implementation and intended impact for the teaching, leadership and assessment of mathematics at Greystoke Primary School. The school's policy for mathematics follows the 2014 National Curriculum Framework and the Early Adopter Early Years Foundation Stage Framework.

Our Mission

At Greystoke Primary School we believe that every child in our school community should have *Limitless Learning* opportunities. We all have the ability to succeed and our school works hard to enable our children to reach their full potential.

Intent

Greystoke Primary School is on a journey towards Teaching for Mastery and our maths teaching and learning journey continues to grow. Our teaching is based on the five key ideas of Teaching for Mastery: Coherence, Representation and Structure, Variation (procedural and conceptual), Fluency and Mathematical Thinking.

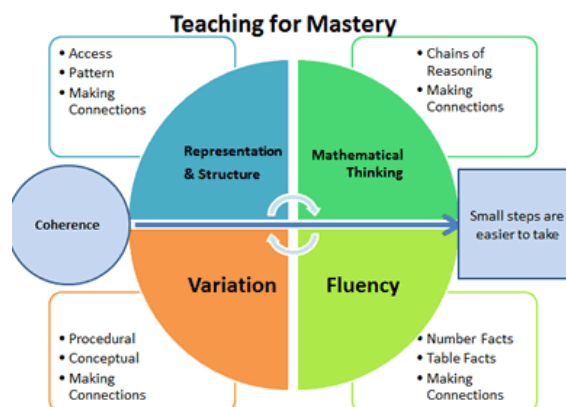
We embed the three aims of the National Curriculum in our teaching: fluency, reasoning and problem solving. We

believe that all three are equally important to develop well-rounded mathematicians and therefore our aim of teaching mathematics is 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.

Children are encouraged to reason mathematically by following a line of enquiry, speculating relationships and generalisations, and developing an argument, justification or proof using mathematical language. They are taught to solve problems by applying their mathematical skills 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. We stress the importance of knowing multiplication tables. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 times tables. All pupils are taught to develop efficient strategies for mental and written calculations which are clearly outlined within our Trust policy. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge.

Our overarching intent is to instil a love of a mathematics in our children and staff; we want our children to be life-long mathematicians and to understand how mathematics is essential to everyday life and that it is critical to science, technology, engineering and finance. Through developing children's curiosity and gaining an appreciation of the beauty and power of mathematics, we want all children to enjoy the subject and to experience success.



Implementation

How mathematics is planned and taught:

Mathematics is taught on a daily basis for approximately 60 minutes. Teaching methods include discussions between teacher and pupil, discussions between pupils, practical work, group activities, individual work, practice of basic skills and routines and investigative work.

Teachers use the White Rose planning scheme to support their long-term planning. White Rose suggests how long to spend on each block of learning, but the length of time spent is down to individual teachers to decide what is best for their classes' learning. Teachers work collaboratively to plan mathematics. The teachers look at what the prior learning was then build the current teaching upon that. Teachers use the White Rose progression maps for overall National Curriculum coverage.

To support our planning, we use various high quality resources:

- NCETM PD materials <https://www.ncetm.org.uk/resources/50639>
- White Rose Schemes of learning <https://whiterosemaths.com/resources/primary-resources/>
- NCETM Mastery Assessment documents <https://www.ncetm.org.uk/resources/46689>
- Gareth Metcalfe's 'I See Reasoning' and 'I See Problem Solving'. <http://www.iseemaths.com/>
- NRich resources <https://nrich.maths.org/>

Planning and Teaching in EYFS

Maths is taught as part of the Area of Learning designated as 'Mathematics' in the EYFS Curriculum. Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. By ensuring the six strands of the mathematics curriculum (1. cardinality & counting 2.comparison 3.composition 4.pattern 5.shape, space and 6. measure) are taught in depth, children leave reception able to count confidently, they will have developed a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. Teachers provide frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. Staff work hard to ensure that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Each session takes the form of a short, engaging and practical input by the teacher followed by small focus group differentiated work led by an adult. Children not engaged in the small group work will access a wide range of maths manipulatives and resources throughout the provision linked to the week's objectives and outcomes as well as opportunities to reinforce basic skills such as number formation using a range of materials, exploration of 'number of the day' tasks and online games to access independently.

Key Stages One and Two:

At Greystoke Primary School there are distinct parts to our maths lessons and the Rosenshine Principles of Instruction can be seen in a maths lesson in the following ways:

Rosenshine's Principles of Instruction	Mastery Maths Lesson Design
1. Daily review 10. Weekly and monthly review	<u>Daily Review</u> What non negotiables for the year group need to be constantly recapped? What did they learn last year that needs to be reviewed? Are there any misconceptions from the previous lesson that need readdressing?
	<u>In Focus</u> An introductory activity for pupils Often open task which gives pupils the opportunity to discuss and explore. Set in the context of a problem to put maths into real life scenarios.
2. New material in small steps 3. Ask questions 4. Provide models	<u>Let's Learn</u> New concepts are introduced in small steps using a CPA approach. Teaching and practise interweaved so the teacher models new learning and children then have opportunity to practise skills (ping-pong). Key vocabulary is introduced Teacher may use concrete materials to model. Misconceptions are addressed.
5. Guide student practice 6. Check student understanding 7. Obtain high success rate	<u>Guided Practise</u> Quick questions where Teacher and support staff use AfL to assess further need. Teachers check for understanding through questioning Time is given to give feedback, model or reteach where gaps remain.
8. Scaffolds for difficult tasks 9. Independent practice	<u>Independent Activity</u> Variation in types of questions (both procedural and conceptual) All children should have access to fluency, reasoning and problems solving questions Opportunities are provided for children to work at a greater depth

Principles of Instruction:

1. **Daily Review** – lessons begin with a short review of previous learning to re-activate recently acquired knowledge.
2. **Present new material using small steps** – recognise the limitations of the working memory by breaking down concepts and procedures into small steps.
3. **Ask questions** – teachers need to ask large numbers of questions to check for understanding
4. **Provide models** – a central feature of giving good explanations. These may include concrete models to aid abstract concepts, worked narrative examples modelling a process
5. **Guide student practice** – give time to guide student practice supported by modelling, corrective feedback and re-teaching where gaps remain.
6. **Check for student understanding** – teachers use their questioning to ascertain from as many children as possible what they have understood? A range of questioning strategies below can be used to do this (see below).
7. **Obtain a high success rate** – teachers need to engineer a high success rate (around 80%) where children are reinforcing error-free, secure learning, improving fluency and confidence providing a platform for independent practice. However, it is still important pupils are challenged here (a success rate a 90%+ is too high).
8. **Provide scaffolds for difficult tasks** – temporary aids may be required to support children in developing a level of independence but are withdrawn at the right point so that pupils don't become reliant upon them.
9. **Independent Practice** – here teachers need to construct learning so that students are able to do challenging things by themselves without help. It is important that the material that students practise is the same as during guided practise for appropriate levels of success to be secured
10. **Weekly and Monthly Review** – to ensure that previously learned material is not forgotten and break the forgetting curve. A variety of retrieval techniques can be used to do this.

Questioning and Reasoning Strategies used at Greystoke Primary School:

- How do you know? Justify Why?
- What's the same? What's different?
- Explain how you got your answer? What did you do?
- What do you notice?
- How many different ways can you show me?
- Think – Pair – Share
- Cold call (no hands up)
- No opt out (bounce back if a child isn't able to answer initially)
- Probing questions (staying with a child to probe deeper to check understanding)
- Say it again better (ask children to rephrase answers a second time to build a deeper, high quality answer)
- Agree, Disagree, Add your own... (to structure class discussion around a question)
- Whole class response: choral, whiteboard, ABCD, thumbs up + down for true or false

Classroom environment

Every classroom has a maths working wall where key concepts, representations, models, vocabulary and methods are developed with the children and displayed to develop the overall learning journey. This allows the whole class to have ownership of their learning and to be able to refer to key concepts through the learning journey.

Children also have access to manipulatives to support them in their learning: number lines, place value charts, multiplication grids, fraction walls, Numicon, dienes, cubes, bead strings and other key resources.

Challenge

Children are challenged through the lessons with directed questioning but they can also be challenged through further tasks: Digging Deeper. The Digging Deeper Tasks focus on the Greater Depth skills of open ended challenge, creating own tasks and proving and justifying their reasoning.

Multiplication Tables

Throughout the year groups in Greystoke Primary, children are developing and consolidating their multiplication knowledge in line with age-related National Curriculum expectations. This includes a variety of tasks:

- Counting stick
- Multiplication games
- MTC simulation practice
- TTRS online

Inclusion and Equal Opportunities (challenge for all):

In line with our mission statement, we believe every child will have equal opportunity to achieve their full potential and access an ambitious and coherent curriculum that leads to deep learning and an understanding of a sustainable world. Regardless of race, gender, cultural background, ability or Special Educational Needs or Disability.

If a child has a special educational need of disability, we will do our very best to ensure we meet that child's individual needs when accessing the mathematics curriculum. We comply with the requirements set out in the SEND Code of Practice. If a teacher has concerns about the progress of a child, then they will liaise with the in school SENDCO to arrange appropriate assessment of need and set up personal provision

through initially writing a Personalised Provision Plan. In some cases, where the demands of the curriculum may be too much, this may involve the use of PIVATS targets to track small step progress for this child or differentiation within the classroom environment to meet the needs of that child.

Impact

Assessing Progress

We measure our impact of our curriculum through the following methods:

- A reflection on standards achieved against the planned outcomes
- Pre and post assessments for units of work using both paper and the Century learning platform formats
- Summative assessment in Mathematics takes place at the end of every term in line with the School and Trust Assessment Schedule. In years 1, 3, 4 and 5 this take the form of Rising Stars Assessment and in years 2 and 6 it is previous SATs papers.
- Formative assessment takes place on a daily basis and teachers adjust planning accordingly to meet the needs of their class. The teaching of mathematics is monitored by leaders through lesson observations and book looks.
- In year 4, the children complete the Multiplication Tables Check (MTC) in June each year.
- Years 2 and 6 also take part in the Statutory Assessment Tests (SATs) that take place in May each year.

As part of a multi-academy trust, we are fortunate to be able to call on the support of other Maths leads and specialist teachers. Through moderation, we can be sure that progress is made across all year groups. If progress is not being made, support is immediate and steps provided to ensure all pupils achieve and make progress.