St Margaret's Academy – Maths Policy

Policy Date: 2021
Review date: Dec 2022

School vision and values

Vision
We want ourselves and the children in our care to be successful, resilient and inquisitive learners who are happy and well-equipped to participate positively in the community and wider society.

Values
Our school values (kindness, respect, responsibility and aspiration) are an essential point of reference on all of our journeys. British values (democracy, rule of law, liberty and respect) play an equally important role.

Definition of Maths

Maths is the study of numbers, shapes and patterns. It provides a foundation for understanding the world and is essential to everyday life.

Headline rationale for Maths

At St Margaret's Academy, we provide children with rich mathematical experiences to enable them to develop as confident and able mathematicians with a sense of enjoyment and curiosity about the subject. We believe that embedding fluency in the fundamentals of Mathematics is a priority for our pupils. We use The White Rose Scheme to support the teaching and learning of maths and adapt it to suit the needs of the school.

Intent in Maths:

UKS2
We intend to provide rich mathematical experiences where children can apply their knowledge of mathematics to everyday life. We aim for children to extend their understanding of the number system and place value to include larger integers. At this stage, we aim for children to develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic. With this foundation in arithmetic, we aim for pupils to understand the language of algebra as a means for solving a variety of problems.

LKS2
We intend to provide rich mathematical experiences where children can apply their knowledge of mathematics to everyday life. We aim for children to become increasingly fluent with whole numbers and the 4 operations, ensuring that they develop efficient written and mental methods and perform calculations accurately. By the end of year 4, we aim for children to have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.

KS1
We intend to provide rich mathematical experiences where children can apply their knowledge of mathematics to everyday life. We aim for children to leave KS1 showing confidence and mental fluency with whole numbers, counting and place value. And to begin to apply this to solve problems using the RICE strategy.

EYFS
Children begin to explore and build confidence with numbers and counting, linking concrete experiences of the world around them. They develop their understanding of numbers to 10, predominantly through the NCETM Mastering Number Project.

How the whole school 'curriculum statement' intents will be threaded through Maths.

1. Underpinning everything is our work on attachment, and social and emotional learning which are integral to all that we do – *In maths, we encourage a 'growth mind set' in which children persevere when solving mathematical problems. We will also equip them with the skills and strategies in order to solve problems. They are encouraged to spot and respond to mistakes and they will know that making mistakes is part of learning.*
2. Early reading and language development across the school are core aspects woven through the curriculum *– In maths, children are taught how to read and solve a variety of worded problems using a strategy called RICE. Key vocabulary is explicitly taught and explained alongside any representations or methods used. The children are encouraged to use this when explaining their reasoning. Lessons provide many opportunities for discussion about mathematical thinking and teaching staff model accurate and appropriate use of mathematical vocabulary.*
3. Teachers plan lessons that inspire and engage, and promote enquiry and imagination so that pupils at all abilities can achieve. We develop curiosity about the world beyond the bay. Progressive subject knowledge and skills are planned to take advantage of local opportunities such as the beach and local artists, as well as national events. We provide opportunities to contribute in the local and global community. *– In maths, children will have the opportunity to apply the skills and knowledge they have acquired to everyday life situations. For example, using money to buy something in a shop, weighing parcels and letters. In Foundation and KS1, the children can explore their interests through continuous provisions. In KS2, enquiry learning further supports the exploration and curiosity in maths.*
4. We support our pupils to develop the skills they need in order to learn for themselves, and to enjoy this learning *– In maths, independence is promoted regardless of ability and this is linked with the 'mastery approach' to maths lessons. Lessons begin with a learning question to promote children's thinking.*
5. We support our families and staff with their well-being *– In maths, planning and resources are shared within a year group with the expectation that staff will adapt and personalise this to suit the needs of their children. Parent workshops are provided to support maths learning at home.*

Best practice in teaching and learning

1. Coverage - To ensure that the National Curriculum 2014 is covered, teachers follow The White Rose Scheme. This scheme breaks down the National Curriculum objectives into small steps which follows a mastery approach to the teaching and learning of maths. Children are provided with fluency, reasoning and problem solving opportunities that will help them to become able mathematicians. Children are given time to explore, practice and apply their maths learning to deepen their understanding. They will also be encouraged to represent their learning in multiple ways and use mathematical language to explain their thinking. Alongside this, materials from other resources such as NCETM and NRICH are carefully chosen to complement teaching.

2. Inclusion - Teachers are responsible to meet the needs of all learners through their teaching of maths. The mastery approach enables all children to have access to learning at their level. Lessons include a key learning question which is adapted appropriately to meet the needs of all children. Teachers have access to support materials for every year group and The White Rose Scheme includes the CPA (concrete, pictorial, abstract) approach to support all children's understanding. This will in turn support their ability to reason mathematically and solve a range of mathematical problems. Greater depth opportunities are included throughout teaching slides, with challenges also provided in independent learning time.
3. SEN- Children who may be working in a year group below, are supported by regularly revisiting the learning, particularly key number facts. Lessons and activities follow a CPA approach in order for them to understand a concept. Teaching assistants may also do interventions (sometimes during lessons) to support the automaticity of number facts.
4. Planning outcomes - Teachers plan purposeful outcomes that engage interest in children with links to everyday life to support the purpose of maths.
5. Planning sequence – The maths objectives are broken down into small steps in order to support learning progression of knowledge and skills. AFL is continually used to identify any misconceptions which are either

addressed whole class, in groups or individually. Revisiting previous learning is included in lessons when necessary to consolidate understanding. Teachers also have access to Flashback 4 materials to aid the retention of previously taught concepts.

6. Success criteria – The success criteria is discussed through the learning objective.
7. Feedback - Feedback is timely and purposeful. Children are given opportunities to respond to teacher marking. Where possible, verbal feedback is given particularly during the point of teaching.

Assessment

Assessment is an integral part of the teaching and learning cycle and will be used as a tool to adjust teaching to meet the needs of each pupil.

In maths:

1. Elicitation tasks are used where appropriate to inform planning. Assessment during the lesson is recorded on a class list, highlighting those who need same day support or pre-teach the next day. Hinge questions used to identify misconceptions within the class and children can be targeted and grouped accordingly. At the end of each term, a White Rose arithmetic and reasoning paper is completed with test scores recorded on an Excel document. Y2 & Y6 will also complete past SATs papers throughout the year.
2. Levels of challenge and learning opportunities are informed by national curriculum expectation as well as the above assessments.
3. EYFS - DfE EYFS framework 'Assessment is based on a holistic view of what the child can demonstrate against each ELG.' EYFS teaching staff are not required to formally record their assessment. Their judgments are taken from daily interactions and observations of each child, that us built up over time.
4. Revisiting previous learning is an important aspect to include in this cycle. This is done through the use of slides (including Flashback 4) or additional early morning work to address any gaps or consolidate prior learning. Some children may attend booster sessions.

Progression of skills

Please see the maths progression documents for:

- Key Objectives progression.
- Year overview

Link here: staff shared – curriculum leadership – maths – documents & policies- progression skills/knowledge

https://drive.google.com/drive/folders/1Rv7Bzj3kSwuqYAZMfD3ZB8l8gNweOWRy

Maths Curriculum Map

Please see the maths long term plan here (White Rose Scheme)

Link here: staff shared – curriculum leadership – maths– documents & policies – curriculum map

https://drive.google.com/drive/folders/183iWOYPXDQ7ODyc7_THZ6dYG11HLhugi

Planning

Teachers use the following links in order to plan how they teach:

https://whiterosemaths.com/resources/early-years

https://whiterosemaths.com/resources/primary

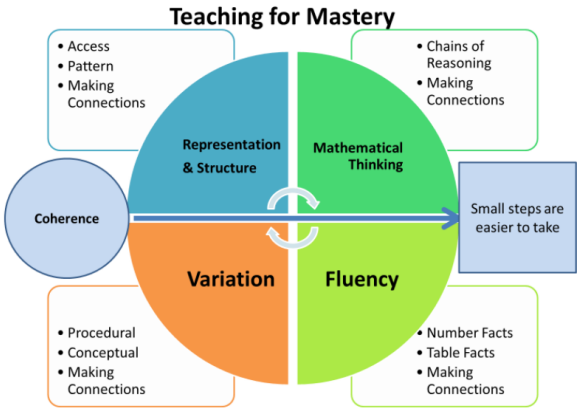
EYFS & KS1 also have access to materials for the planning and teaching of key number facts.
https://www.ncetm.org.uk/maths-hubs-projects/mastering-number/

Mastery in Mathematics

The 3 main aims of the NC and teaching of mastery are fluency, reasoning and problem solving. All of these are important to have, in order to become a successful mathematician.

'Mastering maths means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject. Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material.' (NCETM)

The Five Big Ideas (NCETM) underpin the teaching for mastery.



The Mastery approach also allows for teaching staff to create high quality flow. Lesson are carefully planned and sequenced so that the children have time to practice the skills taught and make connections within their understanding. Children are provided with varied representations and learning styles (including CPA) in order for all children to access the lesson.

Fluency

Fluency is one of the NCETM's Five Big Ideas of Mastery and is defined as 'Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics' (NCETM).
By children being able to recall key facts and apply them automatically, they are more able to tackle a complex problem. Their working memory is more free to think deeply about a concept or problem rather than trying to remember a number fact. We aim for our children to have many opportunities to practise and embed facts and procedures through reasoning and solving problems. We also recognise that not every lesson will have problem solving, if fluency is still a focus of the concept.

Reasoning

Reasoning is applying logical thinking to a situation, finding the correct strategy to solve a question and explaining how you have arrived at a solution. We believe that reasoning is an important skill for all children to acquire. It supports the ability to problem solve and provides opportunities for fluency to be improved. Reasoning about what is already known allows for connections to be made to what is unknown and also can support the solution of unfamiliar problems. We use STEM sentences to support children's understanding and explanations. Research by *Nunes (2009)* identified the ability to reason mathematically as the most important factor in a pupil's success in mathematics. We believe that all children should be provided with opportunities to develop mathematical reasoning skills and that this is embedded into our planning and teaching sequences.

Problem solving

We believe that all children can be problem solvers and that by 'teaching for mastery', we can provide many opportunities for them to gain the skills in order to be a confident and resilient problem solver. Problem solving in maths is finding a way to apply the knowledge and skills you have acquired to answer both familiar and unfamiliar problems. It can rely strongly on fluency however it does also allow for the consolidation of knowledge and skills. When solving problems, children are encouraged to use the RICE (Read, Illustrate, Calculate, Explain) strategy. The RICE strategy follows a model of George Polya (1973), who proposed 4 stages in problem solving:

- Understand the problem
- Devise a strategy for solving it
- Carry out the strategy
- Check the result

As part of the illustration process, children are encouraged to construct a bar model to support their understanding of a problem. Teachers will also model how to solve problems by adopting a 'Think aloud' strategy where they model how an 'expert learner' solves a problem.

Vocabulary

Using correct mathematical language is crucial for thinking, learning and communicating mathematically. It is important for all children, from an early age to be exposed to and explore math vocabulary appropriate to their learning. Math vocabulary is taught alongside representations and methods in order for children to make connections between them. STEM sentences support children to articulate their thoughts with accurate and appropriate vocabulary.

Classroom environments

Maths is taught in whole class sessions and all children are able to access the lesson regardless of ability. Scaffolding and access to additional resources are provided when needed including: a range of manipulatives; vocabulary displayed on the learning wall; strategies and methods displayed on the learning wall and a variety of mathematical games and puzzles to support their problem solving skills. We aim to provide an environment where the children can feel confident making mistakes and understand that is a part of learning. We want them to obtain a 'have a go' attitude to maths. In EYFS & KS1, the environment is seen as another facilitator of children's learning.

Process

After a new method or strategy is introduced, the children have many opportunities to embed them through grouped, paired or independent practice. Prior learning is revisited, particularly their learning of number to support the retention of skills and knowledge. Flashback 4 slides are used to revisit previous learning. These are adapted where necessary to meet the needs of the class. At the end of each term, the children will complete a White Rose assessment which consists of an arithmetic paper and a reasoning paper. In years 2 and 6, they will also complete a SATs past paper. Any gaps identified in either lessons or an assessment are addressed as soon as possible.

Maths across the curriculum

To reinforce Maths being a fundamental aspect of everyday life, links are often made with Science, Computing and Design Technology. The children will discuss how the skills they have learnt in maths can be applied to solve problems in these subjects. In FS and KS1, the application of mathematical skills is part of continuous provisions. This gives the children many opportunities to make connections in their learning of maths.