Whinmoor St Paul's C of E Primary School

Mathematics Guidance Document

Introduction

At Whinmoor St Paul's we believe that Mathematics is a tool for everyday life. It is a whole network of concepts and relationships which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real life problems. It also provides the materials and means for creating new imaginative worlds to explore.

Using the Programmes of Study from the National Curriculum for Mathematics we aim to develop:

An enjoyment and curiosity of mathematics and for children to feel confident to become successful;

- Children's abilities to use and apply mathematics to solve problems in both the classroom and In real life" contexts;
- A confidence to communicate ideas in written form and orally;
- Independent and collaborative ways of working, encouraging children to share ideas and solve problems together;
- A wide range of mathematical vocabulary to be modelled and used in the classroom environment;
- The children's ability to recall mental facts accurately and quickly and using effective written calculation methods;
- Children's logical thinking, reasoning and ability to problem solve as transferable life skills.

Purpose of Study

'Mathematics is a creative and highly inter-connected 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.'

Primary National Curriculum.

Intent

The teaching and learning of maths is fundamental to ensure every child's success as a lifelong learning and citizen of the world. We are committed to ensuring that every pupil becomes a fluent and confident mathematician ready for their future lives.

Math is explicitly taught at every phase of our children' education and it is paramount that children make a positive start at Whinmoor St Pauls. We promote a positive 'Ambition of All' attitude to learning Maths ensuring every child is supported to become numerate and confident in Maths.

Maths is taught explicitly and is also embedded throughout the curriculum, using and applying Maths learning to support learning in other curriculum areas. We develop our mathematical skills through perseverance, inquiries, team work, taking risks and resilience to become fluent mathematicians and ensure that the children feel empowered to take on new challenges which allows them to deepen their understanding of Maths through complex and creative problem solving from our Early Years all the way through to Year 6.

EYFS

'Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically.' **Early Years Foundation Stage Statutory Framework 2024**

The children in EYFS experience rich learning opportunities which foster and develop mathematical thinking.

Our Early Year's team aim for all children to be able to count confidently and develop a deep understanding of the numbers to 10. In Nursery, children focus on numbers 1-5 and Reception focus on numbers up to 10, as well as, the relationship between the numbers and the patterns within them. Early Years provide frequent and varied opportunities to build and apply this knowledge, using manipulatives and pictorial representations. This allows children to build a secure number knowledge and vocabulary from which a mastery of mathematics is built on.

Alongside this, they practise and develop fluency with basic number facts and learn about key mathematical code and representations such as numerals, signs and number sentences. This prepares them to continue their Maths learning in Key Stage 1. In addition to this, the EYFS curriculum provides many rich opportunities for children to develop their special awareness and reasoning skills through areas such as shape, space and measures. Pattern plays a key role in developing these skills and is a focus for both Nursery and Reception.

We aim for our children to have positive attitudes towards mathematics, have the confidence to 'have a go' and not to be afraid of making mistakes. This is developed through lots of modelling and discussions about looking for patterns and relationships, spotting connections. Children are encouraged to talk their peers and adults about what they notice with confidence.

Mastery

Aligning with the experiential opportunities in EYFS, we use a mastery approach to teaching and learning in Maths to ensure that children develop deep and lasting understanding of mathematical procedures and concepts.

We use the White Rose Maths Scheme of Learning as a guide and follow their yearly overview to ensure that sufficient time is given to build and develop number competency as well as to ensure coverage of the full range of mathematics within the Primary National Curriculum. The emphasis is on an 'Ambition for All' Maths approach and teachers plan sequences of lessons, targeted support and interventions to ensure that children are enabled to stay together and to master Maths.

Each mathematical concept or procedure is built up in 'Small steps' with guidance taken from White Rose Maths Scheme Small Steps Guidance and from progression in the strands of the DfE Ready to Progress Criteria.

Concrete, Pictorial and Abstract

When introducing concepts, children are given the opportunity to support their understanding using concrete manipulatives alongside pictorial models. These may also help the children to explain their reasoning and to apply their skills to problem solving.

Calculations

Efficient Calculation methods (both mental and written) are taught as set out in our Calculation Policy. Children are supported to understand efficient methods and then to use them fluently. Children develop efficient, accurate and clear methods for the four operations and they learn to present them logically and neatly to reduce the risk of accidental errors. A culture of repetition is key to ensuring that children achieve automaticity with these calculation methods.

Explicit instruction, modelling and adaptive support

Explicit instruction is one effective method for teaching all groups of children, and stronger children can benefit from increased variation, adaptation and additional practice to deepen learning. In each lesson, every teacher provides models and appropriate scaffolding to support children's learning key information which will ensure they will become more independent thinkers as the scaffolding is no longer needed.

Fluency

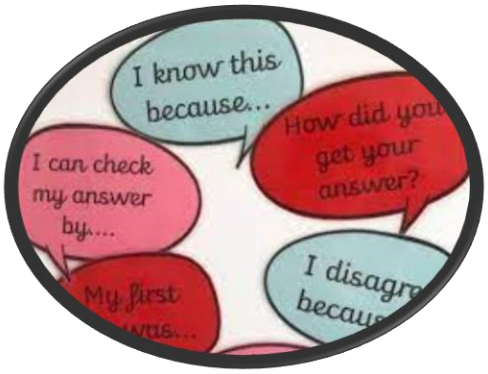
Once concepts are secure, children are taught to increase the speed and fluency of key related number facts and calculations. At Whinmoor St Paul's we set out for each year group which number facts should be learned for rapid or automatic recall and specific mental Maths strategies that are needed. These are set out through our K.I.R.Fs (Key instant recall facts)

Classes practice using low stakes quizzes, quick recap sessions and mini plenaries which have a positive impact on memorization. Gaining automaticity in in key knowledge reduces the risk of overloading the children' working memory and allows them to tackle more complex Maths as they work through the school.

Mathematical Language and Vocabulary.

At Whinmoor St Paul's we understand that mathematical language is crucial to children's mathematical thinking. So we introduce new words from the curriculum in a suitable context, with relevant real objects, mathematical apparatus, pictures and/or diagrams, explaining their meanings carefully. In lessons, talk partners are used to get children using mathematical vocabulary, providing the opportunity for every child to engage in mathematical discussion. Key vocabulary used in a topic are displayed on the Maths working walls with the definition written underneath.

Language structures (Stem sentences) provide children with the ability to articulate their understanding, in turn allowing them to reason and to apply their understanding to solving problems.



Questioning challenges children to gain a deep understanding of concepts and they support one another to explain using partner talk.

Asking closed questions limits the scope of a pupil's response to a correct or incorrect answer and deprives them of the opportunity to talk through their thinking. By using open questions we encourage children to explain the steps they have made and make use of any new maths vocabulary they have learnt.

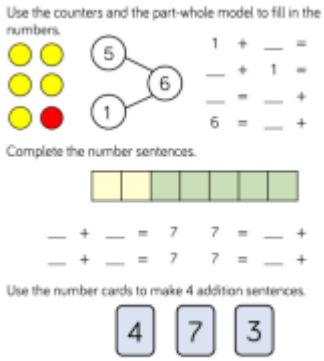
Pupils are encouraged to tell the story and ask the question. This allows them to relate the mathematical concept to a concrete example or to real life. e.g.

How many different ways can you find to sort them?

Correct mathematical vocabulary is introduced to describe mathematical concepts and displayed on the working wall during each unit of learning. Additionally, children are supported to use a range of reasoning frames to articulate their mathematical reasoning such as 'I know this because…' and 'The strategy I used was …'

Variation and Intelligent practice

Our aim is to provide children with opportunities to encounter mathematical concepts in all its different forms.



Ensuring that not every practice exercise looks the same prevents mechanical repetition and ensures that pupils are given every opportunity to explore the concept and to understand fully.

Marvelous Mistakes

We know that in order to make progress and to learn more, remember more and do more, we need to challenge ourselves. We teach the children that it is ok to make a mistake and that this is necessary to move our learning forward. In doing so we show our risk taker, thinker, inquirer, communication and perseverance learning traits. Discussing the 'marvellous mistakes' that we make allows us to gain a deeper and fuller understanding of the mathematical concepts.

Implementation

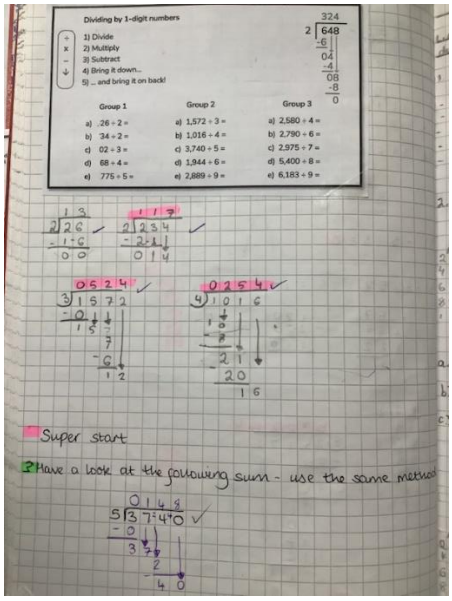
Each individual class teacher is responsible for the planning of Maths for their class in line with the National Curriculum expectations. Planning is completed for each session based on the needs of the children within the class and the next steps that are needed within their learning. Maths units are taught discreetly, and cross-curricular links are made with other areas of the curriculum, as much as possible.

We use the White Rose Maths Scheme of Learning as a guide and follow their yearly overview to ensure that sufficient time is given to build and develop number competency as well as to ensure coverage of the National Curriculum.

Units of work are planned - according to the needs of the children within the class- and are based upon gaps in learning that are identified through teacher assessment and pre teaching sessions, when required. Using this knowledge, teachers plan a series of lessons and learning opportunities. Teachers use the Small steps guidance for each topic of Maths as well as their knowledge of the children to prepare their medium term plans and are then able to draw on resources from the Small Steps Guidance to plan lessons.

Making connections

Children are also taught different methods and explore when different methods would be most useful. Children are taught how and when to apply different calculations to solve problems. They explain which method they used and why using Maths Talk. Our intent is that fluency with recall or facts and procedures enables children to choose and use efficient calculation methods and to make connections and apply them to other areas of Maths. For example, children must have rapid recall of multiplication facts and related division facts to be able to recognize multiples, solve division problems and later to convert improper fractions to mixed numbers.

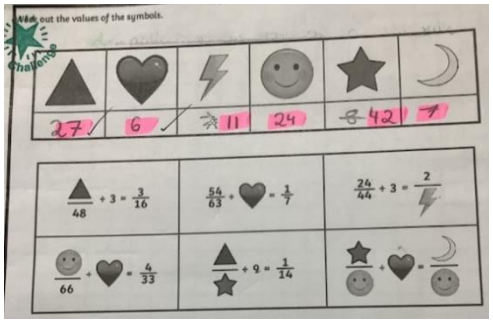


Pitch, Pace and Challenge

At Whinmoor St Paul's the expectation is that the majority of children will move through the topics at broadly the same pace. However, decisions about when to progress will always be based on the security of children's understanding and their readiness to progress to the next stage. Children who grasp concepts rapidly will be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material will consolidate their understanding, including additional practice, before moving on.

Problem Solving

Problem solving is taught alongside the curriculum content so that children can develop their conceptual understanding. Children are taught Maths specific strategies for approaching different problem types so that they increase in confidence in tackling problem solving more independently.



Resources

Teachers are guided by their knowledge of the children and the White Rose Maths Scheme of Learning and related premium resources in addition to MathsShed and Master the Curriculum which act as both invaluable resources and pedagogical guidance for each unit of learning, allowing CPD opportunities for all teachers in order to teach the subject to a high standard which ensures every child is ambitious and challenges themselves. Teachers are

also supported and guided by the DfE Ready to Progress Criteria Guidance Documents using the NCTEM as support and a range of additional resources saved on the teachers Maths folder. Staff have opportunities to receive CPOD opportunities and share best practice at half termly maths updates and moderation in staff meetings.

Learning Outdoors

Learning Maths outdoors provides invaluable opportunity for children to be active, to develop and maintain their 'Ambition for All' attitude to Maths. The environment is used to provide concrete opportunities for real life learning and children sometimes use outdoor materials such as leaves and stones as concrete manipulatives. Learning outdoors promotes team work and communication allowing the children to develop their understanding of the

Maths as well as being a diverse backdrop of applying Maths to different contexts and problem solving. This experiential approach, established in our EYFS learning, continues to support and motivate the children throughout the school.

Units of learning

Within each unit of learning throughout the school you will find there is-

- Flexible use of the White Rose Maths Small Steps Guidance and related resources to present new materials in small steps.

- Vocabulary development related to the unit of Maths, vocabulary is introduced at the start of each lesson, with teachers modelling the use of the vocabulary throughout the unit.

- Concrete, pictorial and abstract methods to support deep understanding and facilitate reasoning and problem solving.

- Explicit instruction in key learning, with opportunities for stronger children to explore wider variation or intelligent practice

- Models and examples provided with clear steps to success. Models and learning recorded on the Working Wall to support children' learning.

- Opportunities for Maths Talk and Questioning with modelled sentence stems on display within the classroom to support mathematical discussion.

- Opportunities for children to check their understanding throughout their learning

- Scaffolding and support within each lesson with pre-teach, post-teach and planned interventions to support children as necessary when needed.

- Opportunities to embed and practise skills in Maths lessons, morning challenges and throughout the day.

- Retrieval of prior learning including practice of key number facts for quick recall, calculations and mental Maths strategies. This might entail use of WRM Flashback Four (last lesson, last week, last term, last year), focusing on the KIRF for this half term, multiplication table

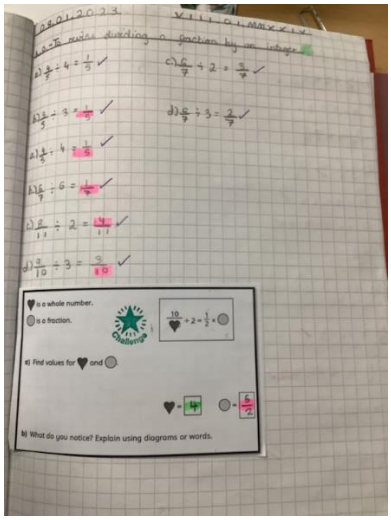
- Opportunities for all children to access complex or open-ended reasoning and problem-solving tasks.

- Teaching of specific problem-solving strategies for different ‘Greater Depth’ problem types.

- Opportunities to explore Maths in Outdoor Learning.

Maths books.

Each classes maths books showcase the steps of learning their class is working on. Within each pupil’s books you will find challenges for lessons which are used to provide
opportunities for all children to practise their fluency of a concept in challenge 1. Challenges 2 and 3 increase in complexity and may
provide additional opportunities to develop fluency, to explain reasoning or to attempt the more complex problem solving associated with
Greater Depth learning.



Formative Assessment and Feedback

Throughout the week, feedback in Maths is provided to improve pupil learning and should target specificlearning gaps.

NCETM, Marking and Evidence Guidance for Primary Mathematics, 2016 states:

‘Teacher’s marking can provide extra feedback to support children’s learning. However, the most important activity for teachers is the teaching itself, supported by the design and preparation of lessons.’

Assessment is not just used to track children’s learning but also provides teachers with up-to-date and accurate information about the specifics of what children do and do not know. This information allows teachers to adapt their teaching so it builds on children’s existing knowledge, addresses their weaknesses, and focuses on the next steps that they need in order to make progress.

At Whinmoor St Paul’s assessment in Maths is continuous. From the beginning of every lesson, teachers and teaching assistants will be assessing what their children are, or are not understanding and use this to scaffold each segment of the lesson. Interventions will be both planned for and ‘live’, meaning that misconceptions are dealt with immediately and high attaining children are challenged appropriately.

Effective marking and feedback are an important element of teachers’ responses children’s learning. This may be given either orally or in written format but is always:

- specific, accurate, and clear(for example, ‘You are now factorising numbers efficiently, by taking out larger factors earlier on’, rather than, ‘Your factorising is getting better’); given feedback sparingly so that it is meaningful (for example, ‘One of the angles you calculated in this problem is incorrect—can you find which one and correct it?’;
- compares what a pupil is doing right now with what they have done wrong before(for example, ‘Your rounding of your final answers is much more accurate than it used to be’);
- encourages and supports further effort by helping children identify things that are hard and require extra attention (for example, ‘You need to put extra effort into checking that your final answer makes sense and is a reasonable size’);
- provides guidance to children on how to respond to teachers’ comments and give them time to do so; and
- provides specific guidance on how to improve rather than just telling children when they are incorrect (for example, ‘When you are unsure about adding and subtracting numbers, try placing them on a number line’, rather than ‘Your answer should be -3 not 3’).

Timetables

At Whinmoor St Paul’s we believe that secure and confident knowledge of times tables is vital to children’s success in Maths. Being able to do times tables is really important as it makes lots of other bits of maths easier. If you knew your times tables, imagine how easy you’d find most multiplication problems you come across! They are the building blocks of Maths and with multiplications understood then this leads to doors in many other areas of Maths becoming unlocked!

Here are some ways which memorising times tables can benefit your child:

1. Knowing their times tables will give your child confidence in their ability in Maths. Our aim is for all children to be able to mentally recall their times tables at pace, moving away from counting on their fingers as they become more confident, as this confidence will help them solve a range of tasks at primary school and ease their transition through Primary School years and then into High School.
2. If a child is confident with their times table skills, then this can reduce the cognitive load when learning a new method. An example of this is when learning the long multiplication method; if a child is already confident with their times tables then they can solely focus on the new skills with the method, e.g. where to carry numbers, when a place value holder is needed, estimating and checking that their answer is correct. This will not only help to ensure that their calculations are accurate, but speed up the process of learning a new method and also boost their confidence as they see that they have.
3. Times tables help your child to grasp other mathematical concepts, such as fractions, division, ratio and percentages to name a few. Children who do not know their times tables will not be able to access more complex procedures, this is vitally important when your child reaches Year 6 for their SATs papers.

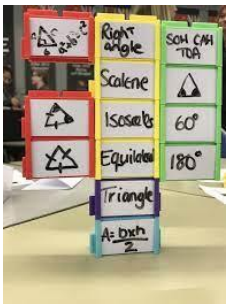
Strategies to support SEND learners

Within Maths our curriculum is ambitious and designed to give all learners, including those with SEND or high needs the knowledge and cultural capital they need to succeed.

With our belief that 'Ambition for all pupils', the White Rose Maths resources ensures that everyone can improve and succeed at maths through the sequenced progression of small steps. Using our knowledge of every child, we will use and adapt specific resources and evidence-based strategies to ensure that every learner has the resources to match their needs. Dependent on needs we will teach the same curriculum with additional strategies and resources to match their needs. For others we put in place ambitious targets for the children and measures to ensure these are met drawing on progression documents and assessments to identify gaps and provide the support needed for progress to be made. We are inclusive and encourage the teaching of one curriculum that works for all with support and challenge provided as needed. Strategies include:

Scaffolding:

- The Concrete, Pictorial, Abstract approach allows pupils to understand a concept through representations such as a ten frame, place value counters, base10/dienes, bead strings or cuisinaire rods. When modelling using these representations, the teacher will make it clear that these are available to access, support and stretch understanding later on.



- Steps to success are modelled on the working wall with clear steps to success that provide scaffolds for pupils to become confident with their learning.
- New material is presented in small steps and only proceeded from once mastered.
- Support for SEN children with learning using maths facts which may include using visual representations or flashcards.
- All scaffolding follows a 'I do, we do, you do' approach.

Explicit instruction:

- Teachers will give explicit instruction through worked examples and will model their thought processes in this to allow pupils the opportunity to practise this process afterwards.
- Pupils will be taught sentence stems and language structures to allow them to articulate processes and understanding
- Pupils will be given specific opportunities to practise specific skills that are barriers to learning
- Visual aids and concrete examples will be modelled using manipulatives by the teacher to embed and deepen understanding. Visual aids can be found within SEND packs, such as number lines, hundred squares, bead strings, number flash cards etc.

Cognitive and metacognitive strategies:

- Tasks may be ‘chunked’ into smaller steps.
- Sentence stems and steps to success will be made visible to children to support independent work.
- Support may be given to avoid cognitive overload. So if the focus of the lesson is one area of understanding (for example calculating area of a rectangle by multiplying the length by the width, then providing the pupils with times tables grids where this is an obstacle will help them focus on the learning rather than struggling with the mechanics of the calculations.
- Memorisation of key facts and processes will be encouraged and supported through an ethos of repetition.
- Pupils will learn specific strategies for problem solving to give them the tools to apply their knowledge and skills in different contexts.
- Regular focus on marvellous mistakes allow pupils to spot, explain and rectify error and help teachers to identify and tackle misconceptions early on.
- Dependent on ability, children with SEN may be asked to evaluate their own learning and discuss what they need to do to move their learning forward.

Flexible Groups / Fading:

- Temporary groups may be established to support learning in a particular concept
- Pre-teaching and support with key ideas before a topic is taught to increase confidence and participation.
- Identifying knowledge of precursors (indicators of what a pupil needs to have covered in order to access a step is essential so we incorporate revisiting these before a topic is taught.

Use of technology:

- Technology provides many useful resources for providing visual stimuli for the concrete and pictorial approach, allowing pupils to interact directly with material while learning concepts.
- These included interactive whiteboard resources as well as website such as Maths Shed or the WhiteRose smart tech to reinforce visual representations of number.
- Maths Shed Timetables, Mathletics, One Minute Maths and Hit the Button are examples of website that allow the pupils to practise recall of facts, mastery of which enables pupils to be more confident in maths and reduces cognitive overload when calculating.
- The children take pride in neat presentation in Maths because the children know that organized, clear presentation allows them to be accurate, to follow their steps to success and to minimize the possibility of accidental errors.
- The children know that they can look to their working wall for support with their learning and this helps them to become more confident and independent learning.
- Children are supported to check and explain their own understanding and they know how to let their teacher know if they would like more support to move their learning on. Formative assessment is used consistently in all lessons so that the children are supported to keep up not catch up.
- Gaps identified are addressed swiftly and there is a constant focus on consolidation and next steps and the lesson sequences.

Impact

At Whinmoor St Paul's, our aim is to develop confidence and fluency in Maths which equip them to move on to the next stage of the education with the knowledge, skills and attributes they need to succeed. A high proportion of children consistently achieve expected standards in Maths and a higher proportion of children also achieve the higher standard at the end of KS2.

- Lessons show high levels of engagement and confidence with excellent learning to learn behaviours throughout the school.
- Children routinely use Maths talk to explain their reasoning using the correct mathematical vocabulary.
- They enjoy practicing and mastering Maths skills and calculations
- The children enjoy challenging themselves in Maths, whether it is to become more fluent with skills of Maths facts or to apply their Maths in a different context or problem.
- They know that taking a risk and making a 'mistake' will help them to correct and move their learning on.
- The children take pride in neat presentation in Maths because the children know that organized, clear presentation allows them to be accurate, to follow their steps to success and to minimize the possibility of errors being made.
- The children know that they can look to their working wall for support with their learning and this helps them to become more confident and independent learning.
- Children are supported to check and explain their own understanding and they know how to let their teacher know if they would like more support to move their learning on.
- Formative assessment is used consistently in all lessons so that the children are supported to keep up not catch up. Gaps identified are addressed swiftly through post teach or in the moment interventions during lessons and there is a constant focus on consolidation and gaps in learning minimized.

'Ambition for All' Maths Lessons

Our maths lessons show high levels of engagement and confidence with excellent learning to learn behaviours throughout the school.

- Children routinely use Maths talk to explain their reasoning.
- They enjoy practicing and mastering Maths skills and calculations The children enjoy challenging themselves in Maths, whether it is to become more fluent with skills of Maths facts or to apply their Maths in a different context or problem.
- They know that taking a risk and making a 'marvellous mistake' will help them to move their learning on.
- Home learning is uploaded onto the school website during periods of sickness or school closure which aligns with learning in school so that children are well supported to maintain their progress in Maths.
- Children receive feedback and support via the online platforms to continue to check understanding, address misconceptions and maintain confidence in Maths.

Celebrating Maths

Maths is something that is celebrated across school and children regularly share their Maths learning in assemblies including their matheletics success, timetable success and through our Stars of the Day and Stars of the Week.

Praise is given both for attainment and progress and to attitudes to learning. Certificates for Mathletics are presented during our Friday Celebration Worship which is shared with families and carers.

Where to find evidence of the subject in school:

- In every classroom from Year 1 to Year 6, there will be a set of Maths books in which children complete their work.
- A Mathletics award chart is displayed in classrooms from Year 3 to Year 6.
- Photographs of teaching and learning in Maths is display on the Staff Shared drive in Maths Subject Evidence (Year) / Maths.
- Planning may be viewed on Staff Shared / Year Group Planning (Year)
- Subject Evidence is saved Staff Shared / Subject Evidence (Year)
- Subject Leader Monitoring can be found in the Maths Subject Leadership File and is saved in Staff Shared / Subject Leadership (Year)

Where to find resources in school:

- White Rose Maths Scheme of Learning is saved on the Staff Shared / Academy Maths as well as the Calculation Policy, End of Unit and Termly Assessments and Fluency Retrieval Tasks.
- These may also be accessed from the White Rose Maths website.
- Staff shared / Maths also contains the NCTEM materials and other useful teaching resources including:
- DfE Ready to Progress Criteria and Year Group Guidance
- Nrich Mastery Tasks,
- NCTEM progression Mastery links
- Reasoning and Problem Solving materials.
- Copies of Arithmetic Assessments are available from the Maths Subject Leader.
- A supply of concrete Maths resources is situated in storage units within each classroom. Contact the Maths subject leader if you require any additional resources.

Useful websites:

https://www.ncetm.org.uk (free individual registration. Access CPD resources)

https://whiteroseMaths.com/

http://mathsshed.co.uk/

https://thirdspacelearning.com/ (free individual registration to access some resources

https://diagnosticquestions.com/

https://www.topmarks.co.uk/

https://ttrockstars.com