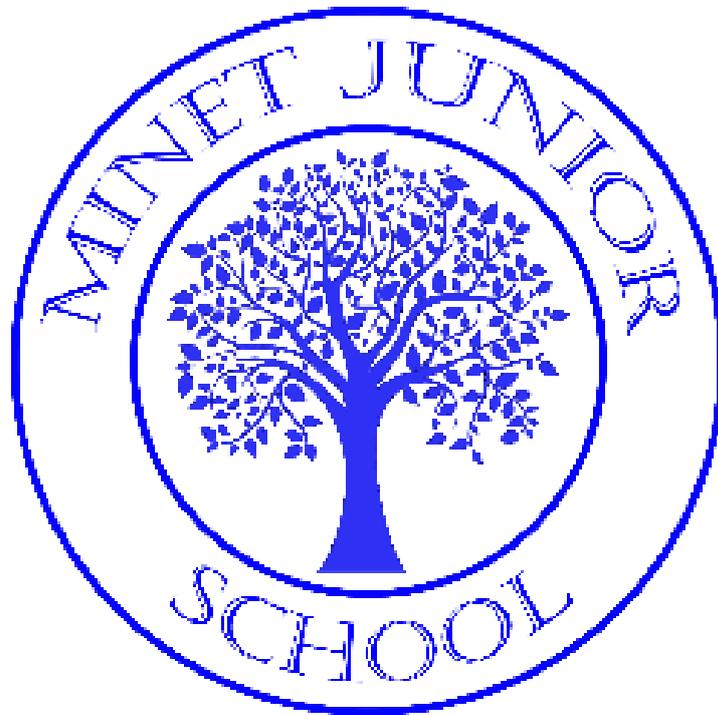# Minet Junior School

Maths Policy 2022 (reviewed in 2024)

Completed by H Elderfield (Maths Co-Ordinator)

Minet Junior School Math's Policy

At Minet Junior School we believe that the contribution of Mathematics to the modern society is significant and essential. Mathematics equips pupils with a uniquely powerful set of tools to enable them to become fluent, to reason, solve problems, make connections and assess risks in their everyday lives. Mathematics skills are vital for the professional opportunities in science, technology, engineering and economics. Through their growing knowledge and understanding, pupils also learn to recognise and value the contributions made by many professionals to the development and application of mathematics.

As mathematics is integral to all aspects of life, with this in mind, we endeavour to ensure that all pupils develop a positive and enthusiastic attitude towards mathematics. We are committed to ensuring that all pupils achieve mastery in the key concepts of mathematics, appropriate for their age group, in order that they make genuine progress, overcome barriers and move through education with confidence.

Intent

The intent of our Mathematics curriculum is to provide all children with the understanding of number, fluency of number, reasoning, problem solving and make connections leading to mastery in Mathematics. It is essential that these intents are embedded throughout all strands of the Maths curriculum.

Through a mastery approach, we believe pupils must be given time to fully understand, explore and apply ideas - rather than accelerate through new concepts. This approach enables learners to truly grasp a concept, and the challenge comes from investigating it in new, alternative and more complex ways.

It is essential to everyday life, critical to science, technology and engineering and necessary for financial literacy and most forms of employment. We want the children to leave Minet Junior School with an appreciation and enthusiasm for Maths, resulting in a lifelong positive relationship in STEM.

- o Deliver a high quality maths curriculum to all, through a mastery approach, that is challenging yet enjoyable.
- o Be fluent in number facts and the fundamentals of maths.
- o Progression through the mathematical strands from year 3 to year 6.

- o To enable children to reason and problem solve with increased confidence and take risks with their learning.
- o Make rich connections across maths to link to everyday life.

Implementation

Our implementation is developed to be specific for the cultures and community that we serve.

- o We provide high quality teaching by all teaching staff and have high standards of all pupils in our school
- o Long term plans are followed that ensure all coverage and progression of the 2014 National Curriculum.
- o We use a variety of planning resources that provides bespoke lessons designed to inform, interest and inspire our children. This is implemented through White Rose Hub maths schemes, Power Maths and documents from the NCTEM.
- o Daily Maths lessons, which give opportunity for all to practice: revisiting, fluency, reasoning and problem solving. All lessons ensure the children's prior knowledge is taken into account so that progress in evident in every lesson.
- o Maths lessons promote the use of concrete, pictorial and abstract approach through conceptual and procedural variation.

- o Provision will be made for children who are not making the expected level of progress through I.E.Ps and interventions
- o Children are assessed in daily lessons through assessment for learning techniques and through summative assessment- three times a year.
- o Children in Year 3 and Year 4 are required to do weekly practice Times Table tests to prepare for the Multiplication Tables Check

- o Children's attainment and progress is discussed by teachers and pupil achievement leaders and if progress is not made, support is immediate and steps provided
- o Children's attainment and progress is discussed with parents/carers during parents evenings

Impact

A mathematical concept has been mastered when the skill can be transferred to a different context and they can show it in multiple ways, through the curriculum. In addition, they can independently apply the concept to a new problem in unfamiliar situations.

The impact of Mathematics in Minet Junior School will be seen through:

- Children demonstrating quick recall of mental facts, including times tables once thoroughly taught
- High level of pride and care in their work and presentation of the books
- Ability to recognise relationships and connections within maths curriculum and other subjects. For example- Geography and other STEM subjects.
- Children are confident and active within all lessons
- Children leave at the end of the Year 6 with the ability to be able to access age related expectations and transition to Year 7 maths effectively.
- Children have the flexibility and fluidity to move between different contexts and representations of Mathematics.

Progression through the Curriculum

The National Curriculum 2014 is designed as a year by year programme of study. Our school follows the model, developed by the Mastery Mathematics programme, which focuses on reaching each domain fully before moving onto the next one. For example, in Autumn 1 the emphasis is on reaching all the concepts in the domain of Number – Place value to build a solid foundation for teaching calculation methods in Autumn 2. **The school currently follows the White Rose Hub Math's Scheme of work (Appendix 1)**

Within each unit of work, the time spent on teaching a specific learning objective or set of learning objectives depends on the needs of the children. Teachers ensure that each concept is grasped and mastered by pupils to enable them to progress to the next stage of learning, equipped with skills needed to become fluent and to reach other key concepts.

'The expectation is that the majority of children will move through the curriculum at broadly the same pace. Pupils who grasp concepts quickly should not be accelerated onto the next stage of maths curriculum content, but instead, they should be challenged through rich and sophisticated, more complex problem solving and application of their skills and will be moving into mastery of maths' (taken from the National Curriculum for England 2014).

Teachers use high quality resources for problem solving, reasoning and showing fluency (e.g. Power Maths, White Rose Maths hub activities, NCTEM (National Centre of Excellence in the Teaching of Mathematics) ready-to-progress criteria).

A Typical Lesson
Pupils are provided with a variety of opportunities to develop and extend their Mathematics skills through:
• Whole class teaching
• Paired work
• Group work
• Individual work

Pupils engage in:
• Times tables or mental fluency practice depending on year group
• Recall and revisiting previous learnt work through flashback 4
• Practical work using concrete and visual resources
• Conceptual and procedural variation
• Investigational activities
• Problem solving and reasoning
• Mastery with depth and greater depth challenges

Within lessons and over sequences of lessons, teachers plan a coherent teaching and learning programme based on the model:
Revisit -> Review -> Teach -> Practise -> Apply -> Reason -> Master -> Review

Teaching of mathematics: Haylock Model

The connective model of learning mathematics
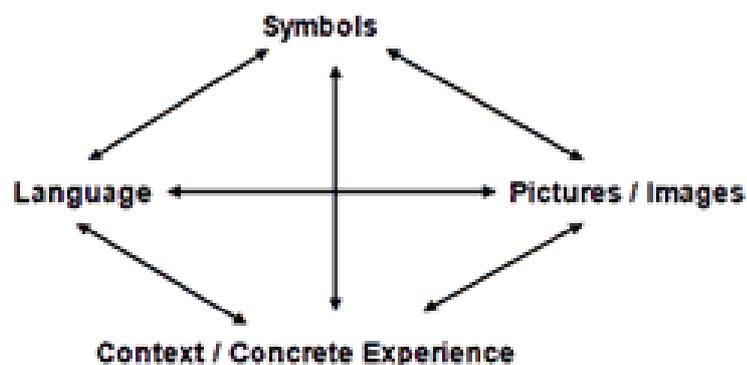
Intelligent practice

A key feature of teaching for mastery is the precise designing of pupil activities and practice questions, so that, rather than pupils repeating a mechanical activity, they are taken down a path where the thinking process is practised with increasing creativity.

For example: By working though the calculations in the example below, a pupil has to carry out the procedural operation of multiplication, but through connected calculations, has the opportunity to think about key concepts involving multiplication and place value.

2 × 3 =	6 × 7 =	6 × 8 =
2 × 30 =	6 × 0.7 =	3 × 8 =
2 × 300 =	6 × 0.007 =	3 × 16 =
20 × 3 =	0.6 × 7 =	6 × 4 =
200 × 3 =	0.06 × 7 =	12 × 4 =

The arrangement of these tasks and exercises draw pupils' attention to patterns, structure and mathematical relationships, thus providing 'intelligent practice' and the opportunity to deepen conceptual understanding.

Planning is done on a weekly basis, based on on-going teacher assessment.

A typical lesson consists of:

- **Recall of previous learning through Flashback 4s-** to enable pupils to reflect on conclusions or statements from yesterday, last week, last month and last year.
  Teachers pinpoint to a particular sections to remind pupils of any misconceptions they had in the previous lesson in order to re-address these again and ensure that all pupils are mindful of them.
  This stage of the lesson is crucial and cannot be missed as it is checking previous learning and making connections to future learning opportunities. This has a direct impact on the progression of Mathematics throughout the school as well as the sequence of lessons in maths. It ensures children know more and remember more.
- **Main teaching session:** This includes a sequence of activities, mindfully designed, to scaffold and guide pupils to deeper understanding.
  Teachers plan activities through stages to enable pupils to practice, apply, reason and master each key concept. They challenge pupils to:
  - ➢ Recognise, describe, explain, select or compare structures, methods and images used to represent each concept.

For example: pupils may compare and analyse different multiplication structures or methods and through the <u>conceptual variations</u> develop their understanding and fluency in calculations.

➢ Recognise, describe and explain patterns, similarities and differences between numbers, calculations or shapes and as a result, develop their own chains of reasoning, use rich mathematical vocabulary and show their ability in producing their own examples.

➢ Recognise, describe and explain the relationships between calculations or properties of shapes to help them establish laws in mathematics, generate rules, generalise statements and suggest next steps. Teachers vary the content of each activity to draw attention to certain features
For example, pupils may recognise and explain that by halving one factor and doubling the other, the product remains the same. E.g. 12 x 35 = 6 x 70 = 420
Pupils may also notice that the number of faces in a prism is by two greater than the number of vertices shown in its cross-section. They can generate a formula and explain why the link occurs.

➢ Reach deeper and master the concept by independently solving problems of greater complexity (i.e. where the approach is not immediately obvious) and communicating results clearly and systematically.

- **Plenary** involves work with the whole class to identify progress, summarise key facts, review the content and ideas used in the lesson and discuss next steps. Effective plenaries allow pupils to have enough time for self- assessment and/or peer assessment too.

<u>S.M.S.C</u>

Mathematics contributes to our SMSC development through:

Spiritual development: through helping children obtain an insight into the infinite, and through explaining the underlying mathematical principles behind natural forms and patterns.

Moral development: helping children recognise how logical reasoning can be used to consider the consequences of particular decisions and choices and helping them learn the value of mathematical truth.

Social development: through helping children work together productively on complex mathematical tasks and helping them see that the result is often better than any of them could achieve separately.

Cultural development: through helping children appreciate that mathematical thought contributes to the development of our culture and is becoming increasingly central to our highly technological future, and through recognising that mathematicians from many cultures have contributed to the development of modern day mathematics.

British Values

The mathematics curriculum promotes the British Values of tolerance and resilience through practicing and achieving complex concepts. Pupils are encouraged to become life-long learners, alongside developing their mathematical skills across the curriculum, through enterprising and problem solving.

Pupils are encouraged to persevere and to feel reassured when making mistakes and taking risks, thus developing self-confidence and self-esteem. Teamwork is central to maths through peer-assessment, peer-mentoring and group work. Mutual respect is developed as children work together, build confidence, support and inspire each other.

Resources

Each classroom, year group store cupboard and intervention room is equipped with essential and sufficient quantity of resources to support pupils in developing their skills in the domain of number.

Calculation Policy

A 'Progression through Calculation' policy is used throughout the school to ensure the consistency in structures, models and images used in all four operations. Teachers and support staff use the calculation policy, as guidance for progression of calculations in all four operations. (Refer to the Calculation policy for further details).

Scaffolded

Our staff has high expectations of all pupils, irrespective of ability. They encourage them to be successful and achieve their full potential.

'It's okay to be stuck because it is great when you get unstuck!'

Children are encouraged to have a growth mind-set about their ability to do mathematics. Encouraging children to 'have a go' is seen as paramount. They access each stage of the lesson, showing their optimum in the range of independence, depth of understanding and the level of fluency.

To encourage pupils to demonstrate their full potential in lessons, teachers direct children to the correct level of challenge, based on their assessment in the initial phases of the lesson. This scaffolding enables progression towards mastering concepts. In addition, a child can select their own level of challenge, depending on age group and understanding of their own Mathematical knowledge. All children have work scaffolded to them through labelling of the work as: A, B or C.

Challenge – There is an expectation that all pupils are challenged in their learning of mathematics. It should be evident in the books and lessons taught that pupils are being challenged and **not coasting through the work set.**

Support Staff

Where Teaching Assistants are available, they are fully instructed before the lesson about the key concept, learning objective and activities. TAs use the same teaching methods, modelled by the teacher, to support pupils in class. They refer to the Calculation Policy to help them support the children. Interventions are provided to close a gap, pre teach or reactive to lessons. To close the gap they use the NCTEM RTPs as intervention material.

Equal opportunities

We ensure that all pupils have equal access to the curriculum, irrespective of their background, home language, race, gender and capability. In our daily mathematics lesson, teachers:
- emphasise and display key words and use pictures cues
- label concrete objects and maths resources
- engage in role play or describe a word-problem scenario
- refer to the examples of methods displayed on the maths working wall

Homework

At times there may be opportunities to develop skills and understanding of mathematics through additional activities, some of which may take place at home. Teachers use homework specific textbooks from White Rose hub, so that it matches what the child has been learning in class. (Refer to the Homework policy for further details).

Vocabulary and Language

Developing children's language and vocabulary is absolutely essential.
- In all lessons attention is given to whether key vocabulary has been learnt.
- Paired talk activities are used to encourage children to talk about their mathematics.

- Teachers insist that children mirror the language they hear the adults using.
- Where appropriate, children are encouraged to answer in full sentences.
- Adults mirror back alternative words for the same meaning to enrich children's range of vocabulary. E.g.

Child says 'When you times 3 by 5, you get 15',

Teacher models, 'When you multiply 3 by 5, the product is 15'.

- Children are required to provide justification and reasoning for their answers. For example, 'I know this shape is a square because….'

Teachers are required to have sound subject knowledge and understanding of the correct terminology and vocabulary and they refer to the school's glossary of maths terms (refer to Progression of Vocabulary document), if unsure. For example:

1) 'Do your sums'. There is no such thing as a 'take away' sum because a 'sum' is the result of adding two or more numbers. We use the terms 'calculation' or 'equation'.
2) 'Mass or Weight'. Mass is the measure of matter in an object and it is measured in kg, g, oz etc. Weight is a force, acting on that object and it is measured in N (newton).
3) 'Diamond is a tilted square'. There is no such thing as a diamond in a classification of 2D shapes. The shape often referred to as 'diamond' is a rhombus. The difference between a square and a rhombus is in the measure of their angles.

Cross-curricular links

Mathematics contributes to many subjects and it is important that the pupils are given opportunities to apply and use Mathematics in real contexts or through other subjects. There are regular, carefully planned opportunities for measuring in science and technology, for the consideration of properties of shape and geometric patterns in technology and art, and for the collection and presentation of data in history and geography. Additional enrichment opportunities are provided for pupils to further develop mathematical thinking e.g. through cooking, music, and maths investigations and games.

Working walls

All classrooms have a clear working wall where models, vocabulary and visual images, used in previous lessons, are displayed and referred to. Teachers display:

- examples of calculation methods,
- ideas collected during the lessons by pupils,

- 'Reaching deeper' questions
- Number facts revisited frequently (LKS2- times tables)
- Vocabulary and explanations

Monitoring
Role of Mathematics Subject Leader
The maths subject leader monitors and evaluates the quality and standards of mathematics across the school:
- Ensures that all teachers understand the requirements of the National Curriculum and supports them to follow the medium term planning
- Discusses regularly with the Head teacher and the governors the progress of implementing the National Curriculum for Mathematics in school, through governor meetings, SLT and ELT
- Informs the senior leadership of the progress in developing teaching for mastery in mathematics from CPD received
- Develops policies in line of new requirements and changes
- Leads by example by setting high standards in their own teaching
- Prepares, organises and leads CPD
- Monitors and evaluates mathematics provision in the school by conducting regular work scrutiny, planning scrutiny, learning walks, observations and analysis of formal assessment data
- Takes responsibility for the choice, purchase and organisation of resources for mathematics
- Reports on mathematics to the Head teacher and liaises with the named link governors.

Book scrutiny
When conducting a book scrutiny, the expectation is for all teachers to produce evidence of:
- The use of appropriate objectives/ key concepts from the New Curriculum
- Links made to previous lessons
- The sequence of activities within each lesson enables progression between activities, from using concrete and visual resources to more abstract approach.
- Activities show variations so that each activity is a next step from the previous
- Where suitable, pupils are encouraged to illustrate/extract relevant information from the scenarios and then use them in calculations
- Where suitable, pupils' jottings, illustrations and photographs showing the use of concrete resources or engaging in a role play

- Multi-step problem solving scenarios further challenge pupils to show each step
- Missing number activities encourage thinking and applying the knowledge of number facts, e.g. inverse operations.
- Mastery style assessment questions/ activities are used from the guidance to support teacher judgement
- Efficient methods of calculations and where appropriate, annotated with pupils' explanations of the methods
- The quality of teacher's marking and feedback

Marking

Effective marking and feedback is integral to good teaching and learning processes. By empowering pupils to be actively involved in understanding how they are making progress, it helps to embed learning swiftly and enables accelerated learning (Refer to the Marking policy for further details).

Assessment

Attainment and progress in mathematics learning is assessed according to the extent to which pupils are gaining a deep understanding of the content within each key concept, resulting in sustainable knowledge and skills.
Key measures of this are the abilities to reason mathematically and to solve increasingly complex problems, doing so with fluency, as described in the aims of the National Curriculum.

In our school, teachers use a range of evidence to secure their judgement of the extent to which pupils have developed a deep understanding, knowledge and skill:

- Observations of pupils' attitude, the level of their engagement and independence
- Pupils' Accuracy in using calculation methods
- Pupils' mental maths skills: instant recall of number facts
- The extent to which pupils use their mathematical vocabulary
- Pupils' reasoning skills
- The extent to which pupils solve problems
- Pupils' self-assessment and evaluation of their learning
- The extent to which pupils use and apply mathematics in other subjects
- Pupils' performance in formal written tests
- Marking and feedback notes
- Assessment notes and reports from other professionals that could be involved

Please note in order for a pupils to be considered secure in their relevant band there must be evidence of high level reasoning and in-depth challenges – independent application of multiple mathematical concepts. This will be evidenced through, but not limited to:

- Problem solving activities in the books
- Reasoning extracts
- In-depth tasks
- Responses to next step comments

Refer to Assessment Policy for more in depth detail of assessment in Minet Junior School.

Appendix 1

Year 3

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**			Number **Addition and subtraction**					Number **Multiplication and division A**			
Spring	Number **Multiplication and division B**			Measurement **Length and perimeter**			Number **Fractions A**			Measurement **Mass and capacity**		
Summer	Number **Fractions B**		Measurement **Money**		Measurement **Time**			Geometry **Shape**		**Statistics**		Consolidation

Year 4

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**				Number **Addition and subtraction**			Measurement **Area**	Number **Multiplication and division A**			Consolidation
Spring	Number **Multiplication and division B**			Measurement **Length and perimeter**		Number **Fractions**				Number **Decimals A**		
Summer	Number **Decimals B**		Measurement **Money**		Measurement **Time**		Consolidation	Geometry **Shape**		Statistics	Geometry **Position and direction**	

Year 5

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**			Number **Addition and subtraction**		Number **Multiplication and division A**			Number **Fractions A**			
Spring	Number **Multiplication and division B**			Number **Fractions B**		Number **Decimals and percentages**			Measurement **Perimeter and area**		**Statistics**	
Summer	Geometry **Shape**			Geometry **Position and direction**		Number **Decimals**			Number **Negative numbers**	Measurement **Converting units**		Measurement **Volume**

Year 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**		Number **Addition, subtraction, multiplication and division**					Number **Fractions A**		Number **Fractions B**		Measurement **Converting units**
Spring	**Ratio**		**Algebra**		Number **Decimals**		Number **Fractions, decimals and percentages**		Measurement **Area, perimeter and volume**		**Statistics**	
Summer	Geometry **Shape**		Geometry **Position and direction**	**Themed projects, consolidation and problem solving**								