Viking Academy Trust

Mathematics Policy

Upton Junior School

Approved by the Trust: September 2023

Reviewed every three years unless statutory requirements dictate otherwise.

Last review date: September 2023

Signed  **Chair of Trust**

MATHEMATICS POLICY

The Viking Academy Trust

Empowering Children Through Education: One Childhood One Chance

Schools in the Viking Academy Trust (VAT)

Chilton Primary School
Ramsgate Arts Primary School
Upton Junior School

This **'Mathematics Policy'** is specific to Upton Junior School.

Philosophy

The Nature of Mathematics:
Mathematics teaches us how to make sense of the world around us through developing a child's ability to calculate, to reason and to solve problems. It enables children to understand and appreciate relationships and pattern in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

The new National Curriculum states that:
"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."

At Upton Junior School we see Maths very much as an interconnected and consistent subject which should encourage creativity. As much revolves around the discussion about Maths between talk partners as it does the completion of calculations. We want the children to see Mathematics as being relevant to their world and applicable to everyday life as well as being something that they will need as they move on through their school life and ultimately to the world of employment. To that end, a high-quality, inter-related and creative Maths experience should be one that develops the children's ability to think mathematically and one which allows them to apply the tools to which they have been exposed in a variety of ways.

Following the introduction of the new National Curriculum in 2014 the emphasis has been to ensure that all children:

- Become **FLUENT**
- **REASON** and **EXPLAIN** mathematically
- Can **SOLVE PROBLEMS**

This means that children need to be regularly exposed to opportunities involving increasingly complex problem solving which allows them to apply their Maths knowledge. In doing so they should be encouraged to develop an argument and line of enquiry which they can prove and justify using mathematical vocabulary. This includes the ability to break down problems, both routine and non-routine, into a series of steps.

Aims and Objectives

We want to teach Maths in a way that:

- delivers Maths in line with new National Curriculum guidelines;
- creates a lively, exciting and stimulating environment in which the children can learn Maths;
- promotes the concept that acquiring Maths knowledge and skills provides the foundation for understanding the world around the children;
- encourages children to use mathematical vocabulary to reason and explain;
- allows time for partner talk in order to stimulate and develop a curiosity for Maths;
- challenges children to stretch themselves and take risks in their learning;
- to promote confidence and competence with children's understanding of numbers and the number relationships;
- provides children with the opportunity for deepening their understanding;
- to develop the ability to solve problems through decision-making and reasoning in a range of contexts.

Intent, Implementation, Impact

Intent:

At Upton we follow the Mathematics Mastery approach through the ARK programme, which has three key principles: conceptual understanding, mathematical thinking and mathematical language, with problem-solving at the heart of the curriculum. Instead of learning mathematical procedures by rote, we want pupils to build a deep conceptual understanding of concepts which will enable them to apply their learning in different situations. The habits of thinking mathematically are life-enriching as it is vital to be numerate to participate fully in society. Therefore, we ensure we make rich connections across mathematical ideas to develop those skills from Year 3 to Year 6.

- For our members of staff:
- To promote enjoyment and enthusiasm for mathematical learning through practical activity, exploration and discussion.
- To ask relevant questions to promote mathematical discussion.

For our children:

- To gain mastery and fluency with numbers and the number system.
- To be able to talk confidently using subject specific vocabulary and engage in conversations about maths where they are able to explain their thinking.
- To understand the importance of mathematics in everyday life and for their futures.

- To develop the ability to solve problems through decision-making and reasoning in a range of contexts.

For our school:

- To be an outward looking school, which supports and shares good practice with other schools, as well as keeping up to date with recent research and ideas, including involvement with Kent and Medway Maths Hub.

Implementation:

The Mathematics Mastery curriculum is cumulative, coherent and sequenced. This means that mathematical concepts that are taught earlier in the curriculum are revisited in the context of a new area of mathematics. Each school year begins with a focus on the knowledge, concepts and skills that have the most connections; such as, place value, addition and subtraction. These concepts are then applied and connected throughout the school year to consolidate learning.

The Mathematics Mastery programme has provided curriculum resources alongside professional development. The curriculum is created and adapted to allow all children to have inclusion through the use of scaffolds and challenges. All teaching staff have now been fully trained in implementing the approach in their classrooms ensuring consistency throughout school.

As Mathematical language is a key principle of our approach, at the start of each new topic, key vocabulary (star words) is introduced, revisited throughout lessons and embedded as the topic progresses.
Children are taught through the C-P-A (Concrete – Pictorial – Abstract) approach. This allows teachers to show clear modelling and reinforce the learning that is achieved by going back and forth between the representations, building pupils' conceptual understanding.

All teaching staff also use a six-part lesson structure which allows the lesson to be pacey whilst the children acquire a new skill, apply the skill and deepen the skill within the lesson.

Maths Meetings are used on a weekly basis, using the maths meeting guidance, to give children the opportunity to rehearse and readdress key concepts enabling the information to stay in their long-term memory. The topics selected must be included each term for both fluency and because some key learning will not be revisited until a later term and requires ongoing consolidation.

Feedback is given on children's learning in line with our marking and feedback policy. Formative assessment within every lesson helps teachers to identify misconceptions, the children who are ready for a challenge or the children who need to access support through same-day interventions.

Impact:

The Mathematics Mastery approach allows children to develop their mathematical fluency whilst being able to apply this knowledge through reasoning and problem solving. Therefore, children are able to move between different contexts and representations of maths flexibly. They are also able to show a concept in multiple ways, use mathematical language to explain

their ideas and can independently apply the concept to new problems in unfamiliar situations.

Pupils need to be fluent, but that fluency must encompass understanding and be accompanied by reasoning and problem-solving.

Approach

Upton is now following the Maths Mastery ARK Programme from Year 3 to Year 6. "At the centre of the mastery approach to the teaching of mathematics is the belief that all pupils have the potential to succeed. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems. Similarly, with calculation strategies, pupils must not simply rote learn procedures but demonstrate their understanding of these procedures through the use of concrete materials and pictorial representations." (Maths Mastery Calculation Policy, 2023 – Appendix 1).

It is important that children are allowed to explore Maths and present their findings not only in a written form but also visually; to that end the school will adopt the CPA approach: concrete, pictorial, abstract. This will allow the children to experience the physical aspects of Maths before finding a way to present their findings and understandings in a visual form before relying on the abstract numbers. All teaching staff at Upton attend staff meetings that regularly have a Maths focus, which provide information on current thinking and introduces them to new teaching methodologies and ideas.

Mathematics Mastery

Maths - Expectations

Through careful planning and preparation, we aim to ensure that consistency is carried out throughout the school as children are given opportunities for:

- Six-part lesson which contains; Do it now task, new learning, talk task, develop learning, independent task and a plenary.
- Maths meetings – 10/15 minutes, 5 x per week.

(Maths Expectations attached – Appendix 2)

Planning

Teachers will use a six-part lesson plan which consists of; Do it now task, new learning, talk task, develop learning, independent task and a plenary. Lessons are planned using a common planning format (Appendix 3) and are monitored by the MMSL (Mathematics Mastery Subject Lead) in line with the school's Monitoring Plan.

Planning should demonstrate children's learning being deepened throughout the lesson – this could be completed through using practice/deepen questions. The practice section is used to practice a key skill from the lesson, the deepen section is to deepen the understanding of the new learning. During every lesson children will be allowed to engage in mathematical discussion through the 'talk task' and problem solving through the 'deepening learning' section of the lesson.

Marking

Work in mathematics can generate a great deal of marking and it is recognised that it is not always desirable to mark every piece of work. The children themselves can mark exercises which involve routine practice with support and guidance from the teacher. Where appropriate; children in Years 5 and 6 are encouraged to check computational exercises with a calculator. This can foster independence in the children, who can seek help if they are unable to locate and correct their errors. However, children will be provided with feedback either verbally or through written marking.

Often, in order to clarify understanding of a concept, children will be set a 'Practice/Deepen' task or a written feedback task, but not always for every lesson; these should be completed by the children at the next earliest opportunity after the lesson. When marking work, teachers should adhere to the school's Marking Policy.

Some marking methods may include:

VF – verbal feedback given T – Teacher Help TA – Teaching Assistant Help

Assessment

In order to inform planning and to assess children's progress, teachers will use AfL (Assessment for Learning) opportunities throughout their lessons. Assessment will also be informed by annotated plans and work in children's books. Termly, children will be assessed through the application of White Rose Hub Maths assessment tests or the ARK assessment tests; this summative assessment will be used to identify next steps and therefore inform planning.

Teachers are expected to share progress and assessment details on a bi-termly basis as part of 'Pupil Progress Meetings'.

Resources and Displays

Each classroom will be resourced with materials to support the delivery of Maths; such items might include number lines, multiplication tables, 100 squares, 2D and 3D shapes, multilink cubes, dice, Numicon, Cuisenaire rods and other items. Larger materials such as scales, trundle wheels and measuring cylinders will be held centrally in the Maths cupboard.

Resources should be visibly displayed and easily accessible as children should be encouraged to use whatever resources are available to them in the classroom and which they feel would be beneficial to help them when completing Maths work.

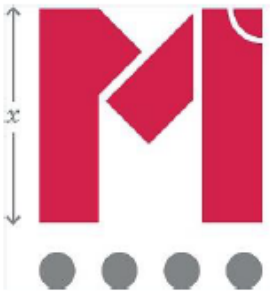
Inclusion

At the centre of the mastery approach to the teaching of mathematics is the belief that all pupils have the potential to succeed. Each child will have an equal entitlement to all aspects of the Maths curriculum and to experience the full range of Maths activities.

Therefore, in delivering Maths, care will be taken to ensure that a variety or learning styles are accessed and teaching methods adopted so that the majority of children can access the learning objective.

Intervention groups will take place both within the Maths lesson and outside; these sessions may be delivered by the teacher or teaching assistant and may involve individual or small group work. Teaching assistants (TAs) have completed a staff meeting with the MMSL on intervention guidance for maths mastery.

Appendix 1



Mathematics Mastery

Progression in calculations

Year 1 – Year 6*

NB. Users should familiarise themselves with the introduction (pp 2-10) to this document before referring to individual year group guidance.

**Progression guidance is not provided for EYFS/Reception since the focus should be on the understanding of early number concepts and number sense through the use of concrete manipulatives, as exemplified in the programmes of study.*

Appendix 2

Maths Mastery Expectations

- All teachers to plan for and use a 6-part lesson structure.
- Teachers should plan maths lessons using the Mathematics Mastery toolkit and school proforma.
- Teachers should use the concrete-pictorial-abstract approach for every topic taught; either within a lesson or across a unit.
- Encourage active thinking and communication of mathematical ideas and problem solving.
- Maths meetings, in 15-minute slots, should happen daily.
- Every lesson should include an opportunity for depth.
- Use transitions as an opportunity to reinforce previously learnt knowledge and softly expose pupils to new concepts.
- All children should be encouraged by the teacher to speak in full sentences when answering and discussing questions.
- Use language as a tool to deepen knowledge and understanding and as an assessment for learning technique. There must be opportunities for pupils to talk about what they are discovering and practise using mathematical language, even if initially this is a 'repeat after me' scenario.
- If tasks need to be differentiated, this should happen by outcome not by objective.
- Stick to the 'fewer topics, greater depth' principle, i.e. not racing to climb the curriculum but exploring its depth.
- Work in books should be marked regularly to enable same day interventions to happen.
- Keep maths lessons pacey, enjoyable and with 100% participation.

Mathematics Mastery

Year: **Unit number:** **Unit name:** **Week beginning:**

Key Vocabulary:

	Key Learning	Do Now	New Learning	Talk Task	Develop Learning
Lesson #					
	Independent Task and differentiation			Key Questions	Plenary
Lesson #					
	Independent Task and differentiation			Key Questions	Plenary