Katherine Semar Infant and Junior Schools

# Mathematics Policy

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# Katherine Semar School's Curriculum

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## INSPIRE CURRICULUM

At Katherine Semar Schools we have developed the INSPIRE curriculum, which is underpinned by what we believe makes an outstanding curriculum for our children; offering them opportunities to question, be challenged, investigate, experience, communicate, create and understand. Learning is developed in a cross-curricular approach wherever appropriate and the children are given real contexts for their learning which motivate them by creating a genuine purpose for learning.

### Introduction

This policy sets out the vision, principles and practice for mathematics at Katherine Semar Schools. It is designed to ensure full compliance with the National Curriculum and to reflect the expectations of the Education Inspection Framework and the School Inspection Handbook. Mathematics is taught as a core entitlement for all pupils, with a clear focus on secure understanding, cumulative progression, fluency, reasoning and problem solving.

The school adopts a mastery approach to mathematics, supported by trusted curriculum resources including NCETM, Number Sense and other carefully selected materials that strengthen coherent sequencing, secure number sense and progressive learning. The curriculum is intended to help pupils know more, think deeper and apply learning with confidence in a range of contexts.

## OUR AIMS IN MATHEMATICS

The mathematics curriculum aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, with a secure recall of facts, efficient methods and increasing accuracy
- reason mathematically by explaining, justifying, generalising and proving
- solve problems by applying mathematics to routine and non-routine tasks, including multi-step problem
- develop secure number sense and understand mathematical structure
- make rich connections across mathematical ideas and between mathematics and other subjects
- use precise mathematical language and communicate ideas clearly in spoken and written form
- experience challenge (thinking deeper), enjoyment and success through a curriculum that is ambitious for all
- develop resilience, confidence and a positive attitude towards mathematics
- are supported through keep up, not catch-up approach so that gaps are identified and addressed promptly

### Statutory Requirements

Mathematics teaching at Katherine Semar Primary School is based on the statutory requirements of the 2014 National Curriculum for mathematics. The curriculum must ensure that pupils:

- are taught the essential knowledge, concepts and methods set out in the relevant programmes of study
- develop fluency, reasoning and problem solving in line with the National Curriculum aims
- build secure conceptual understanding and procedural fluency over time
- apply mathematical knowledge to a range of contexts and subjects
- are assessed against the statutory curriculum and age-related expectations

The curriculum includes, where age appropriate:

- number and place value
- addition and subtraction
- multiplication and division
- fractions, decimals and percentages
- ratio and proportion
- algebra
- measurement
- geometry
- statistics
- position and direction

## OUR INTENT

The intent of our mathematics curriculum is to design a curriculum, which is accessible to all and will maximise the development of every child's ability and academic achievement. We deliver lessons that are creative and engaging. We want children to make rich connections across mathematical ideas to develop **fluency**, mathematical **reasoning** and competence in **solving increasingly sophisticated problems**. Children demonstrate mastery when they can represent concepts or skills in multiple ways, use the correct mathematical language and can independently apply the concept to new problems in unfamiliar situations.

We intend for our pupils to be able to apply their mathematical knowledge across the curriculum and beyond the classroom. We want our children to realise that mathematics has been developed over centuries, providing the solution to some of history's most intriguing problems. We want them to know that is essential to everyday life, critical to science, technology, engineering, and necessary for financial literacy and most forms of employment.

## Curriculum Coverage

The mathematics curriculum provides a broad and balanced sequence of learning that develops from early number understanding to increasingly sophisticated mathematical thinking. It is organised to ensure that pupils revisit, secure and deepen prior learning before moving on.

Curriculum coverage includes:

- number sense, counting, place value and pattern spotting
- calculation in the four operations
- mental and written methods
- fractions, decimals, percentages and equivalence
- shape, space and measure
- data handling and interpretation
- algebraic thinking and generalisation in later primary learning
- multiplicative reasoning, ratio and proportional thinking
- reasoning, proof and mathematical communication
- problem solving in familiar and unfamiliar contexts

The curriculum is sequenced so that pupils move from practical and representational work towards secure abstract understanding. It is designed to build cumulative knowledge, with careful attention to prior learning, misconceptions and future progression.

## OUR IMPLEMENTATION

We provide opportunities to support pupils to develop a "deep, long-term, secure and adaptable" understanding of the mathematics, mastering one topic securely enough to move on and build on it. Mathematics is taught daily through a mastery approach. Teaching is carefully sequenced, purposeful and responsive to the needs of pupils. Lessons are planned to ensure that all pupils, including those who need additional support and those who grasp ideas rapidly, access the full curriculum.

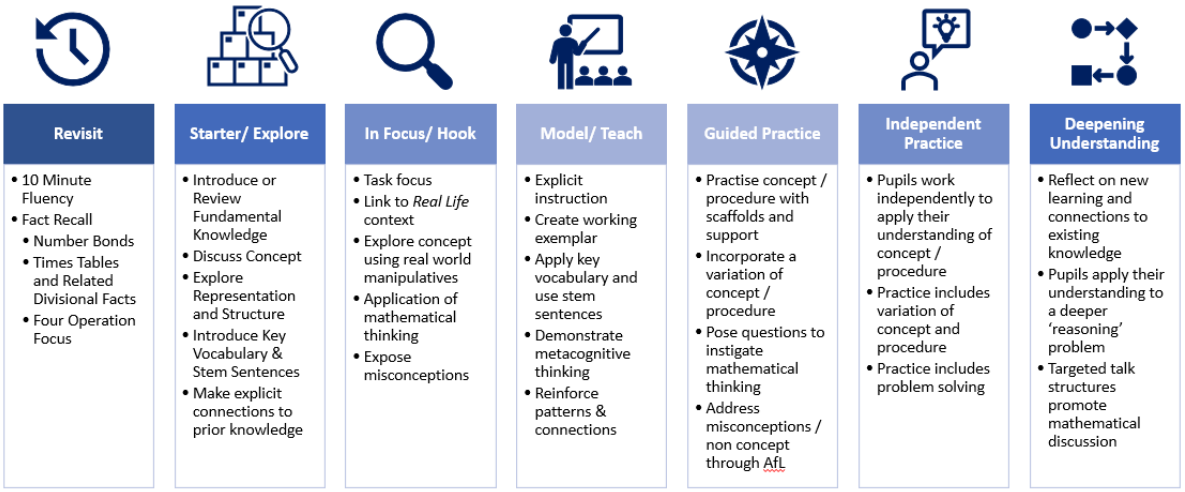
### Teaching model

The school uses a seven-part lesson sequence:

- 10MM fluency
- starter retrieval
- in focus real life hook
- teach
- guided practice
- independent work
- deepening understanding

This structure is used to secure fluency, activate prior learning, introduce new ideas clearly and provide opportunities for reasoning and application.

# Mastery Teaching & Learning Sequence




## Core teaching principles

Teachers consistently use:

- clear explanations and explicit modelling
- real-life 'hooks' allowing children to apply their mathematics to real-life contexts and problem solving.
- my turn, our turn, your turn to support structured learning
- the concrete, pictorial and abstract approach
- careful use of manipulatives to support understanding
- variation to help pupils notice what stays the same and what changes
- daily retrieval to strengthen retention
- precise questioning to check understanding and deepen thinking
- sentence stems, generalisers and structured talk to support oracy
- Use reasoning statements to encourage children to explain their thoughts, processes and understanding.
- independent practice that follows secure guided practice
- tasks that combine fluency, reasoning and problem solving
- Identifying, understanding and applying a number of strategies to solve a problem; there is more than one way.
- Promote a growth mind-set approach towards their learning – developing a love for mathematics.
- Going deeper and broadening children's learning

- Plan conceptual and procedural variation, including non-concepts.
- Allow pupils opportunities to learn from each other and support one another.
- Using learning walls within every classroom to support pupils learning.

## Planning and curriculum design

**Mathematics Planning**

As a school we have developed our own Katherine Semar Mathematics Curriculum which draws upon the resources and guidance from 'Ready to Progress Materials', 'NCETM Spine Materials' and a selection of schemes and supplements to support the planning, teaching and delivery of our curriculum. Our approach and curriculum continues to be tailored to our Katherine Semar expectations. This is to ensure the learning is tailored to the needs of our children – being supported, scaffolded, extended and challenged further where appropriate. The mathematics planning document has been carefully designed to support teachers when planning their sequence of mastery lessons. Areas considered within our planning include; lesson structure, 10MM activities, conceptual variation, procedural variation, fluency, reasoning, misconceptions, extending learning of the whole class and rapid graspers, supporting learning for those who require additional support, a hook/introduction which is in a real-life context, opportunity to develop conceptual understanding through concrete, pictorial, abstract (CPA) approach, carefully planned modelling and opportunity for children to practise and apply their learning.

**Fluency and number sense**

We recognise that 'fluency' is not just about remembering facts. Across both schools, you should usually expect to see every mathematics session begin with 10MM. Fluency facts will be taught within lessons to ensure understanding, as well as practised for recall. You will often hear and see the statements: Prove it! Convince me! Each year group have set fluency facts which are outlined in our fluency policy. There is a whole school focus on developing an instant recall of key facts.

**Reasoning and Problem solving**

Reasoning and problem solving are taught every day and are not treated as separate or occasional activities. Pupils are expected to:

- explain how they know
- compare methods
- identify patterns
- make conjectures
- justify answers
- prove or disprove statements where appropriate
- apply learning in unfamiliar contexts

The school uses mathematical discussion, structured talk and rich questions to develop deeper understanding. Pupils are encouraged to use the language of mathematics accurately and confidently.

**Mathematical language and oracy**

Mathematical talk is central to learning. Staff explicitly teach:

- key vocabulary
- sentence stems
- generalisers
- full sentence responses
- partner talk and group discussion
- progression overviews to support oracy

Pupils are expected to listen carefully, respond respectfully and explain their thinking using correct mathematical language. Books, displays and oral responses should show that pupils are learning the structure of mathematics, not simply completing tasks.

**Questions**

To challenge thinking – teachers use questioning throughout every lesson to check understanding – a variety of questions are used, but you will hear the same ones being repeated including 'How do you know?', 'Can you prove it?', 'What's the value?', 'What's the same/different about?', 'Can you explain that?', 'What does your partner think?', 'Can you imagine?', 'Listen out for more common questions you hear'. Questions are also used to challenge children who have grasped the concept. Children are expected to listen to each other's responses and may be asked to explain someone else's ideas in their own words, or if they agree/disagree etc. You will often hear the teacher asking if anyone would like to respectfully challenge a given answer, rather than telling a child they are incorrect. It is about the children learning from each other and processing and discussing their ideas to 'convince' and 'support' their thoughts.

**Misconceptions'**

These are identified during the planning process and children will be supported through these. We celebrate mistakes to ensure children understand that this is the way we learn. Mistakes are celebrated, addressed and overcome together.

**Homework and additional practice**

Where appropriate, homework may be used to consolidate key facts, secure fluency or support retrieval. It should reinforce class teaching and not create unnecessary cognitive overload.

**Assessment**

Assessment in mathematics is ongoing, formative and responsive. It is used to check what pupils know, understand and can do, and to shape subsequent teaching.

**Formative assessment**

Teachers use:

- questioning
- observation of talk and practical work
- live feedback during lessons
- retrieval quizzes
- analysis of written work
- mini checks for understanding
- review of misconceptions
- pupil self-assessment and peer assessment

Formative assessment informs same lesson and next lesson adaptation, including support, re teaching or increased challenge.

**Summative assessment**

Summative assessment is used, as appropriate, to:

- review attainment against curriculum objectives
- identify gaps in learning
- inform pupil progress discussions
- evaluate the impact of interventions
- support reporting to parents and carers
- inform wider school self-evaluation

**Marking and feedback**

We have a whole school marking policy which is followed within every classroom. The policy throughout the school requires that learning is ticked if correct, dotted if incorrect and a comment is only made if/when a teacher feels this is necessary to move learning forward. The assessment of the learning objective is consistent in all year groups; one tick by the L.O. indicates the children are working towards the learning objective, two ticks indicate they have achieved it and a '?' will be used for those children who have not achieved the L.O. The most valuable feedback is given during a lesson. Feedback is most effective when given during the lesson. Written feedback should be purposeful, brief and linked to the learning objective. Pupils should be given opportunities to respond, correct and improve their work.

Children are encouraged to use purple pens for peer-assessment and self-assessment or feedback. Fluency sessions will often be marked together as a whole class, as will the guided practice- the children will use a purple pen for this also. Children's work will be marked in green pen by adults.

Assessment evidence is not limited to written recording. Pupil understanding may be demonstrated through:

- oral explanation
- practical activity
- reasoning
- diagrams and representations
- independent written work

## IMPACT

The impact of our mathematics curriculum will lead to outstanding progress over time across all key stages relative to each individual child's starting point. It is designed to prepare children for their future in and outside of education so they can become successful in whatever they pursue by leaving our school at least at the expected standard for their age. So pupils understand the relevance and importance of what they are learning in relation to real world concepts. Our rich and broad mathematics curriculum aims to make the children enthusiastic about learning mathematics and gain an understanding of its importance in everyday life.

A mathematical concept or skill has been mastered when a child can show it in multiple ways, using the mathematical language to explain their ideas, and can independently apply the concept to new problems in unfamiliar situations.

Children demonstrate quick recall of facts and procedures. This includes the recollection of the times tables.

-The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics.
- Children show confidence in believing that they will achieve.
- Children show a high level of pride in the presentation and understanding of the work
- Children are developing skills in being articulate and are able to reason verbally, pictorially and in written form.

-Children are developing the ability to make connections between mathematical topics.
- Our children are resilient and they make measurable progress against the National Curriculum objectives.

- Well-planned sequences of learning support pupils to develop and refine their maths skills.
- Children show a high level of pride in the presentation and understanding of the work.
- Children are able to independently apply their knowledge to a range of increasingly complex problems.

## Roles and Responsibilities

### Headteacher and senior leaders

- ensure mathematics is a high priority across the school

- secure the curriculum, staffing, resources and time needed for effective implementation
- monitor the quality of mathematics provision and pupil outcomes
- ensure assessment, intervention and staff development are effective
- report to governors on standards, strengths and areas for development

**Mathematics subject leader**

- lead the development, implementation and review of the mathematics curriculum
- maintain a clear overview of curriculum sequencing and progression
- support staff with planning, teaching and assessment
- monitor books, planning, lessons, pupil voice and data
- identify strengths and weaknesses in provision
- lead professional development and coaching
- ensure resources such as NCETM and Number Sense are used effectively

**Class teachers**

- teach mathematics daily in line with the school curriculum
- plan well-structured lessons with clear learning intentions
- use adaptive teaching to meet the needs of all pupils
- ensure mathematical language and reasoning are embedded
- assess understanding and respond promptly to misconceptions
- maintain high expectations for all pupils

**Teaching assistants and support staff**

- support pupils through pre teaching, guided practice and careful scaffolding
- use agreed representations, language and methods
- promote independence rather than over support
- liaise with class teachers to ensure support is targeted and consistent

**Governors**

- understand the intent, implementation and impact of the mathematics curriculum
- monitor standards through visits, reports and discussions
- support leaders in holding mathematics provision to account

## Inclusion

All pupils must be able to access and succeed in mathematics. The school is committed to ambitious teaching for all pupils, including those with SEND, disadvantaged pupils and pupils who need additional challenge.

**Inclusive practice includes:**

- high-quality whole class teaching for pupils
- adaptive teaching that responds to need in the moment
- carefully selected representations and manipulatives
- pre teaching, same day intervention and targeted follow up
- sentence stems and structured talk to support communication
- clear, consistent routines to reduce cognitive load
- additional adult support where it improves access and independence
- challenge through depth rather than premature acceleration
- broken down steps and focused scaffolding where needed

**Additional principles**

- pupils are not labelled by fixed ability
- all pupils are expected to engage with the full curriculum
- support must not narrow access to rich mathematical thinking
- misconceptions are identified early and addressed constructively
- barriers to learning are removed through reasonable adjustments and careful planning

**Adaptive teaching**

All lessons are planned with care to ensure there are methods, strategies and resources to support all learners and to extend children who have rapidly grasped the concept. At Katherine Semar our aim is that all children reach their full-potential. This is done through careful planning with small progressive steps, giving all pupils the opportunity to see and apply mathematics in everyday life, providing opportunities for children to experience concepts, objects and situations which may be unfamiliar to them. Secure understanding is developed through the CPA approach.

**Professional Development**

Staff development is essential to strong mathematics teaching. Professional development will focus on:

- subject knowledge and pedagogical knowledge
- mastery teaching principles
- the concrete, pictorial and abstract approach
- effective use of NCETM and Number Sense resources
- planning coherent sequences of learning
- questioning, oracy and mathematical discussion
- identifying and responding to misconceptions

- assessment for learning and adaptive teaching
- supporting fluency, reasoning and problem solving

**Professional development will be delivered through:**

- staff meetings
- coaching and modelling
- collaborative planning
- lesson study or learning walks
- subject leader support
- review of assessment and pupil work
- targeted training for identified needs

**Inspectorate Expectations**

This policy meets inspectorate expectations by ensuring that mathematics is:

- well designed, coherently sequenced and ambitious
- compliant with the statutory National Curriculum
- taught so that pupils learn securely over time
- focused on the important mathematical knowledge, language and methods pupils need
- supported by clear modelling, explicit teaching and precise vocabulary
- structured to develop fluency, reasoning and problem solving
- accessible to pupils with SEND and disadvantaged pupils
- monitored through work scrutiny, learning walks, pupil voice, lesson visits and assessment information
- adapted in response to evidence from pupils' learning and understanding

The policy also reflects expectations that pupils:

- know more and remember more
- develop secure number sense and recall of key facts
- explain methods accurately
- reason mathematically
- apply learning to unfamiliar contexts
- experience challenge without losing access to the full curriculum

**Monitoring and Review**

**OUR MONITORING**

At Katherine Semar we believe that the most effective way to monitor the impact of our Mathematics policy is to utilise and triangulate a broad range of moderating activities, involve our stakeholders, and apply these regularly, consistently and robustly. Through our annual Monitoring, Evaluation and Review cycle, we employ the following monitoring activities in Mathematics:

- **Lesson Observations and Learning Walks**
- Senior Leaders and Subject Co-ordinators regularly undertake planned and unplanned lesson observations and learning walks. These have a clear focus and feedback and findings are used to inform individual and whole-school Continuing Professional Development (CPD), School Development Planning and future monitoring activities.
- **Internal and External Assessments**
- In line with the school's assessment policy, each year group undertakes a range of internal and external assessments as appropriate to their age and stage of development. Data from these assessments is used to inform planning, teaching, interventions, and adult support to ensure all children are making maximum progress.
- **Deep Dives**
- 'Deep Dives' of books, planning and learning outcomes are carried out by subject coordinators, Senior Leadership Team and whole staff.
- **Pupil Progress Meetings**
- Half-termly pupil progress meetings are held between class teachers and senior leaders. These review the progress of each child as an individual and ensure quality first teaching and relevant interventions ensure every child makes maximum progress.
- **Pupil Conferences**
- Regular conversations and feedback with our pupils allows for pupil voice to be integrated with the development of our mathematics curriculum, teaching and learning.
- **Governor Visits**
- As part of the Governors' Monitoring, Evaluation and Review cycle, lead governors in each subject, make regular visits to school to monitor progress towards the school development plan.
- Monitoring activities include a range of teaching and learning observations, discussions with subject co-ordinators, meetings with pupils, visits to subject specific celebration assemblies, work dives and subject leader reports.
- **Pupil interviews**
- Senior staff, subject co-ordinators and governors take regular opportunities to listen to the views of pupils in relation to their experience of Mathematics at our school and their feedback actively informs subject development through our curriculum action plan.
- **Staff Meetings**
- Teachers to feedback at staff meetings to support the development of the mastery curriculum at Katherine Semar (what is working successfully, where can we progress and develop further?).
- **Mathematics Monitoring Days**
- Termly mathematics monitoring days led by subject leaders with a changing focus such as; planning dives, book looks, learning wall evaluations, learning walks of mathematics teaching and learning, analysing mathematics data.

This policy will be reviewed regularly by the subject leader and senior leadership team and formally updated in line with the school review cycle.

**Links to Other Policies**

- Teaching and Learning Policy
- Assessment Policy
- Marking and Feedback Policy
- SEND Policy
- Equality and Diversity Policy
- Behaviour Policy
- Calculation Policy/ calculation overviews
- Fluency Policy
- Homework Policy
- Child Protection and Safeguarding Policy
- Accessibility Plan
- Staff Development Policy