



Stone C of E School

Mathematics Policy

This policy was adopted on: Autumn 2017

The policy is to be reviewed: Autumn 2020

Rationale

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 Stone CE Combined School, we aim to inspire all children to reach their full academic potential whilst developing an enthusiasm for mathematics. In line with the National Curriculum aims, we ensure that our curriculum enables children to:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Mathematics is an inter-connected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

This policy is set within the context of the school's vision, aims and policy on teaching and learning.

Procedure

During the foundation stage, in the reception year, our aim is for pupils to cover a broad curriculum that leads towards achieving the national expectations as described in the Early Learning Goals. Children receive regular short whole class inputs as well as adult led activities. In addition, mathematics activities are available for children to explore in continuous provision.

In Key Stage 1 and Key Stage 2, the daily mathematics lesson lasts for one hour plus an additional 15 minutes mental maths session.

Opportunities for cross-curricular maths are built into our curriculum and are expected to be evidenced on medium term planning at least once per half term.

Maths Curriculum 2014:

Early Years

The Early Years Foundation Stage outlines the following requirements for mathematics:

Provide children with opportunities to:

- practise and improve their skills in counting numbers, calculating simple addition and subtraction problems
- describe shapes, spaces, and measures

ELG 11 Numbers: children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract 2 single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

ELG 12 Shape, space and measures: children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Key Stages 1 & 2

The new national curriculum programmes of study for mathematics are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage, if appropriate.

Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower Key Stage 2 (Years 3 & 4)

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Upper Key Stage 2 (Years 5 & 6)

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of

problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

Planning and Lesson Organisation

In Early Years, coverage of content is planned using the White Rose Maths Hub long term plan, which follows the Singapore approach. Objectives are planned for and communicated to parents in a planning overview for each topic. These are available on our website.

From Year 1 to Year 6, teachers use the Maths No Problem Scheme (a Singapore Maths approach) alongside the National Curriculum to ensure that all age related objectives are taught. Long term plans are in place in order to map coverage of topics over the course of the year for each year group. Medium term planning outlines coverage of objectives for each half term and daily planning provides additional detail for each lesson. Half termly overviews are available on our website for parents to refer to in order to support their child.

Teachers are expected to adapt the long term plans as necessary in order to address the needs of their class.

Maths No Problem Scheme of Work

Key Information

- Maths [textbooks and workbooks for](#) years 1 to 6
- Based on the evidence-based approach developed in Singapore
- Fully aligned with the 2014 English National Curriculum for maths
- Complies with the UK's High Quality Textbook guidance published by the National Centre for Excellence in Teaching Mathematics (NCETM)

Problem Solving

Lessons and activities are designed to be taught using problem-solving approaches to encourage pupils' higher-level thinking. The focus is on working with pupils' core competencies, building on what they know to develop their relational understanding, based on Richard Skemp's work.

Concrete, Pictorial, Abstract Approach

Based on Jerome Bruner's work, pupils learn new concepts initially using concrete examples, such as counters, then progress to drawing pictorial representations before finally using more abstract symbols, such as the equals sign.



The questions and examples are carefully varied by expert authors to encourage pupils to think about the maths. Rather than provide mechanical repetition, the examples are designed to deepen pupils' understanding and reveal misconceptions.

International Research

By incorporating established learning research into a highly effective approach, Singapore has become a “laboratory of maths teaching”. The Primary Maths Series is founded on the international research of Piaget, Dienes, Bruner, Skemp and Vygotsky and has been tested and refined over the last 30 years in Singapore.

UK Evidence

The Maths — No Problem! primary series was assessed by the DfE’s expert panel, which judged that it alone met the core criteria for a high quality textbook to support teaching for mastery. As a result, the Maths – No Problem! Primary series is the only textbook which has been placed on a list of recommended textbooks for schools on the mastery programme.

Lesson Structure

In Years 1-6, daily mental mathematics lessons involve counting, practising number facts, learning mental maths strategies appropriate to each year group and application of these strategies to real life. We aim to make these sessions as fun and interactive as possible in order to promote an enjoyment of mathematics.

Daily whole class sessions follow the Maths No Problem structure:

Anchor Task: hook, hands-on, practical task to introduce concept.

Structuring: discussion of learning in Anchor Task and modelling of different methods.

Documenting: children recording their steps to success in their books/as a class and discussing their preferred method.

Guided Practice: teacher modelling solving a given problem step-by-step and children practising with a partner/group.

Independent Practice: children answering workbook questions/mastery/greater depth activities as appropriate.

Plenary: a whole class review of the learning ensuring that all children are given opportunities to access mastery and greater depth questions.

Differentiation

Within the daily mathematics lesson, teachers are expected to provide opportunities for all children to be challenged at a level appropriate to their ability.

We recognise the fact that there are pupils of different abilities in all classes and we use a variety of methods to ensure suitable learning opportunities for all pupils. We achieve this by:

- setting common tasks which are open-ended and can have a variety of responses;
- using mild, spicy and hot tasks in order to ensure effective support and challenge – these include mastery and greater depth activities in order to assess age related expectations and children who are working at a greater depth within the expected standard
- supporting groups of pupils during lessons

- providing resources of different complexity according to the ability of the pupil

Children who did not meet age related expectations during previous years will recap objectives from the previous year group/s in order to ensure that gaps in their knowledge are avoided. This may be in whole class lessons or in small group/one to one interventions depending on children's individual needs.

Some children may require further challenge, in which case they will have access to Mastery with Greater Depth activities. The new curriculum is a mastery curriculum, which emphasises enrichment activities in order to apply age related expectations, rather than acceleration activities which move learning on to the next year group's objectives. This ensures that children's skills are fully embedded and less gaps are apparent in their understanding. The National Curriculum states:

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

Calculation Policy

We have a separate Calculation Policy based on the Maths No Problem approach. This is available to view on our website.

Maths Interventions

During termly pupil progress meetings, booster sessions are planned for children who are not making expected progress. For children who require more intensive support, a trained TA delivers the Catch Up Numeracy programme on a 1:1 basis.

Monitoring and assessment

Teachers use a range of methods in order to monitor and assess pupil progress, including:

- high quality questioning and discussion during lessons
- working with focus groups of children
- communicating with TAs who have worked with focus groups of children
- quality marking children's books on a regular basis (at least once a week for each child and twice a week for pupil premium children)
- assessment materials in children's books in order to enable self, peer and teacher assessment
- setting targets for each child, which are regularly practised and reviewed
- 'The Dip' for self-assessment
- peer assessment
- regularly updating assessment documents
- termly summative assessment materials

Homework

It is expected that each week children in years one to six will complete a homework task either on Sumdog, an online provider, or a written task. They are also expected to practise number bonds or times tables on a weekly basis, which they are tested in school (see Homework Policy for task timings for each year group).

Parental Involvement

It is our school policy to provide parents and carers with opportunities to work with their children at home. These activities may only be brief, but are valuable in promoting children's learning in mathematics. Activities are sent home on a regular basis (see the separate school Homework Policy).

The school holds annual curriculum workshop sessions for parents. These are catered towards identified needs of parents e.g. calculation strategies. The evenings provide activities for all ages and abilities and allow parents to see the progression of tasks across the school.

Pupil progress in mathematics is reported to parents during parents' evenings, within written reports and through regular updates where issues are identified.

The Subject Leader

The subject leader will create and monitor an annual action plan and attend relevant training sessions in order to further their understanding; communicating this with the rest of the staff. They will lead staff training as appropriate, setting high expectations for the teaching of maths, and will be involved in monitoring of lesson planning, teaching and assessment in liaison with SLT.