# Mathematics Policy
# Parkfield Community School

**Aims**

**What is mathematics and why is it important?**

Mathematics is the means by which we observe and make sense of our world. In this subject, students learn to understand, explain, predict and represent events, make informed choices and tackle everyday problems. Mathematics is of central importance to modern society. It is key to jobs in our digital economy and critical to science, technology, finance and engineering. Mathematics is necessary for any employment or independent life and we encourage our children to recognise this.

We aim to prepare children for the next stage of their education and lay the foundations for successful lives after school. We recognise the importance of preparing children for the jobs of tomorrow, which will require greater mathematical skills than in the past, including thinking mathematically in order to use technology that as yet doesn't even exist.

Our teaching aims are aligned with those of the National Curriculum: **fluency, reasoning** and **problem solving** – both in the mathematics lesson and across the curriculum. We place strong focus on the acquisition of basic number facts and **fluency in arithmetic procedures**, alongside **developing conceptual understanding** enabling pupils to solve increasingly complex problems in maths, across the curriculum and later in the workplace and life in general.

We teach for mastery, this means that all children are taught one set of mathematical concepts and the big ideas in mathematics. Lessons are carefully crafted in order to allow all pupils to access these concepts and ideas and explore the rich connections between them. We have high expectations of our pupils and strive to make the mathematics curriculum accessible to all, providing different tools to scaffold learning and questions to challenge deeper thinking. Pupils across a year group will move through the programmes of study at broadly the same pace. We recognise that all children need a deep understanding of the mathematics they are learning in order that future learning is built upon firm foundations. Learning from colleagues in Shanghai and Singapore, we have adopted same day 'keep up/catch up' sessions and additional practice to prevent children falling behind.

At Parkfield Community School we believe everyone is capable of learning mathematics, given sufficient time, good teaching, appropriate resources and effort. *(See footnote i) for the principles of a growth mindset.)* We aim to build resilience in pupils to ensure all pupils leave us with sound mathematical skills, which will enable them to realise their potential wherever they live and whatever their background.

**Aspects of mathematics teaching at Parkfield Community School:**

- A coherent journey through the curriculum is planned (learning in small daily steps, which might be broken down further for some children);
- Learning of new concepts is through a concrete – pictorial – abstract approach for all year groups;

- Carefully chosen representations in lessons expose the structure of the mathematics and based upon sound subject knowledge, teachers plan to explore difficult points in order to develop deep understanding of concepts;
- Children are taught to think mathematically and reason logically – looking for patterns and relationships;
- Communication - precise mathematical language is used in oral/written explanations;
- Adults use skilful questioning to reveal, probe and address misconceptions;
- Variation is used to explore the essential features of concepts and non-examples are used to avoid/address misconceptions;
- Mathematical skills are practised, applied and assessed across the curriculum;
- A mathematically rich environment supports learning;
- Fluency and flexibility are developed in every lesson (inc looking at relationships and making connections);
- Teaching is responsive ensuring that children grasping concepts rapidly are challenged to explain their ideas, using increasingly complex and refined mathematical reasoning, which proves they understand the underlying structure. Diagrams/sketches/tables reveal the level of understanding. Activities and questions used encourage generalisations to be made. Pupils are further challenged through a range of rich and sophisticated problems;
- Skilful assessment identifies children who are struggling to grasp concepts leading to teacher-led guided groups, rapid (usually same day) interventions with qualified teachers, bespoke homework, parental involvement and if required, structured interventions.

**Planning**

We believe that the key to success with all learners is quality first teaching (QFT – see footnote ii for details). This is promoted through a wide range of bespoke professional development from specialist teachers (maths specialists, teacher coach, involvement with national programs – eg: Subject Knowledge Enhancement via NCETM).

Objectives are taken from the relevant year band overview and medium term plans. These objectives enable progression in learning towards National Curriculum level descriptors. One of the DfE recommended textbooks, Maths-No Problem! is used to support teacher planning and provide a coherent learning journey.

Teachers crafting lessons together is an important aspect of CPD within the school (half a day per week 'PPA' time is a contribution toward this), the school leadership team and a team of maths specialist teachers (from across the MAT) are available to support maths planning. Open lessons and lesson study are established features of CPD across the MAT, which provides teachers with regular opportunities to observe/team teach maths lessons alongside each other and maths specialist teachers. Detailed medium term plans are provided by the maths leader which aligns with textbooks and resources from the NCETM. There is a range of resources available to support maths specific subject and pedagogical knowledge development for all staff.

Lessons are crafted collaboratively for each year group and flipcharts for the IWB are the plans. These are saved in the planning folder on the school computer system, easily accessible to all in order to encourage the sharing of ideas.

**Lesson Structure/Role of the Teacher/Teaching Assistant**

Lessons are structured around the concrete – pictorial –abstract approach, providing opportunities throughout for discussion, using mathematical vocabulary, developing mathematical thinking and using multiple representations. There should be opportunities for each child to record independently in every lesson (in different ways).

The teaching is episodic and whole-class based with everyone generally covering the same content. Guided groups and keep-up/catch-up sessions are led by qualified teachers. Teaching assistants may circulate during the main part of the lesson, or take the lead on some whole class activities. There is an additional fact fluency session timetabled to take place at least 4x a week in order to develop fluency with basic number facts, such as number bonds, addition facts and multiplication tables – these are often led by teaching assistants. Daily 2 minute chanting is another aspect of developing fact fluency.

Formative assessment takes place throughout every lesson as teachers/TAs observe and listen to pupils engaging with activities, ask key questions, provide a range of shared and independent tasks, use quick diagnostic tasks/questions and allow time for sharing and critiquing strategies. Opportunities for peer/self assessment are planned in order to develop the children as independent learners. (*See the assessment policy for more guidance on this.)*

The aim of our curriculum is to explore the big ideas in mathematics, encourage deeper thinking and independence as well as a secure understanding of key mathematical structures. It is not to produce a page of calculations, which is abstract to any real life situation. To support this approach **we do not erase incorrect answers or approaches** as they provide a valuable clue to the path a child is taking and is valuable assessment information. Mistakes are considered learning opportunities and correct answers are often just the beginning of a learning activity.

Although maths is taught as a discrete subject, staff are encouraged to exploit cross-curricular links and provide opportunities for children to demonstrate their mastery of concepts or skills in other subjects (eg: science, ICT, PE, PSHE, topic).

**It is the responsibility of teaching assistants** working within any maths lesson **to ensure they have read, and if required, discussed the planning** with the class teacher and have prepared any required resources, including bespoke resources to support children with specific needs. They are expected to provide feedback to the teacher on a daily basis for the children they have observed within the classroom. This feedback may be verbal or if preferred, written on their copy of the maths plan or on 'post-it' notes, or in a maths journal.

Learning in books is presented and marked in accordance with guidance in the staff handbook/assessment book.

**Classroom Environment**

The classroom/school environment should be mathematically rich and support current learning.
Maths working walls should be interactive, clearly visible to children and provide key vocabulary and representations. Resources such as large number lines and place value charts, teaching clocks, thermometers and additional prompts and challenges would be useful to display throughout the year. Further guidance on creating mathematically rich environments and working walls is available as a leaflet for staff or through dialogue with maths leader.

**Homework**

Appropriate homework activities are set for each child. These may focus on the development of fluency with basic facts, eg: number bonds or times tables, or provide additional practice of a concept learnt that week. From Y2 some homework is set via Mathletics (online resource) which children should be using at least three times a week. Teachers will also set other homework tasks, which may be games to play, facts to learn, or paper based questions to answer and return. The key facts for each year group are provided for parents. There are options such as maths homework clubs for children who need additional support with mathematics, or for children who have no home internet/computer access.

**Family Partnerships**

It is vital that parents and carers are actively involved in their children's learning. Maths Inspire Workshops take place twice a year for each class. During these workshops, parents have an opportunity to work with their children on fun, purposeful maths activities that can be extended into the home. Each workshop is planned and delivered by the class teacher in collaboration with the maths leaders, who keep an overview of workshops across the school. There is also considerable support offered to parents via the Maths Academy and the school website In addition, we provide a range of homework clubs, maths homework help, regular maths input on newsletters and personal contact with the maths leader for support.

**Resources**

Each class/year group has a range of general mathematical equipment (eg: dictionaries, base ten, dice, tens frames, counters, counting sticks, Numicon, Cuisenaire, etc). A wide range of additional resources are available upon request – see maths leader. Each term, the maths leader/s will check classroom resources to ensure teachers have the tools they require to teach effectively.

Each classroom has an interactive whiteboard and support is available for teachers in their use. A further range of software is used, which teachers should be familiar with. Recommended websites are listed on the school website and shared with staff via email updates. There are additional resources via the Mathletics website to support teachers during lessons via the interactive whiteboard and for homework and assessment activities.

Throughout the year additional activities are organised to raise the profile of maths within the school and children's enjoyment of this area; these may include visitors to promote maths skills and maths trails and challenges in collaboration with other schools.

**Equal Opportunities**

The provision of maths teaching is regardless of race or gender and should allow all children to reach their full potential.

**Record Keeping/ Assessment**

Maths workbooks/journals provide evidence of progress, along with teacher assessment notes. Learning should be recorded in as many ways as possible to provide the child with a range of experiences.

Assessment is an ongoing process in the classroom which forms the basis of future action. Formal and informal teacher assessments are based upon the practical, written and oral work completed by the children. Regular

moderation meetings take place throughout the year for teachers to compare, discuss and agree what learning in books reveals about children's understanding.

Summative assessments take place at the end of each unit and at least once a year as written tests. Written tests are analysed in order to support end of year assessment judgements and guide future planning.

Each child should be involved in the review of his/her progress and be able to contribute to discussions about different aspects of his/her work, including involvement at parent meetings.

Refer to assessment guidance for further information.

**Special Educational Needs/Gifted and Talented**

We aim to provide a rich mathematical education, which will develop the potential of all pupils. In line with NCETM guidance on the teaching of mathematics, we recognise that, '*There is no such thing as 'special needs mathematics' or 'gifted and talented mathematics'. Mathematics is mathematics and the key ideas and building blocks are important for everyone.'* However a child who is assessed to have special education needs in mathematics will have a maths target on an IEP and be placed on the school's SEND register and receive additional support organised and monitored by the SENDCO.

Various enrichment activities are organised throughout the year for pupils who frequently grasp concepts rapidly in the daily mathematics lesson, these focus on deepening their understanding through rich and varied problem solving rather than acceleration. These children may also be given different, more challenging tasks during daily fact fluency sessions and for homework. The maths leader is available for advice on the type of challenging and stimulating problems most likely to prepare these pupils for an exciting future in mathematics.

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**Footnotes:**

**i) Growth Mindset features:**

- Everyone can learn mathematics to the highest levels
- Mistakes are valuable
- Questions are important
- Mathematics is about creativity, pattern spotting and sense making
- Communication and making connections are vital components of mathematics
- In a mathematics classroom the focus is not on performing or giving quick answers
- Depth of understanding is more important than speed

**ii) QFT includes:**

- Highly focused lesson design with sharp objectives
- High demands of pupil involvement and engagement with their learning
- High levels of interaction for all pupils
- Appropriate use of teacher questioning, modeling and explaining
- An expectation that pupils will accept responsibility for their own learning and work independently
- Regular use of encouragement and authentic praise to engage and motivate pupils
- An emphasis on learning through dialogue, with regular opportunities for pupils to talk both individually, in pairs and in groups.