**ENGLISH MARTYRS MATHEMATICS POLICY**

**Introduction**

At English Martyrs, we believe that mathematics will equip our pupils with a powerful set of tools to understand the world. These tools include logical reasoning, problem-solving skills and the ability to think in abstract ways. We try to deliver mathematics as a creative discipline to stimulate moments of joy and wonder when a child solves a problem for the first time, discovers a more efficient solution to a problem or discovers hidden connections.

It is our aim that pupils view mathematics not as a subject but as a set of skills required for the various life stages from entering university to balancing a household budget, applying for a home loan, or assessing a possible business opportunity. When our pupils eventually leave education and seek out a career, they will need to call upon the mathematical skills and strategies they have learnt at school. At English Martyrs, we hope all our pupils will do so, with confidence and positivity.

Furthermore, through mathematics, we aim to develop analytical thinking which we believe will promote learning throughout the curriculum and indeed our pupils’ educational life.

When our pupils approach a mathematical problem they: collect and interpret the data, break down its content and solve their parts using rational and logic. If our pupils are able to understand mathematics and arrive at logical solutions, they will be able to prepare their minds when they face real life problems. They will be able to look for the best logic, see the possible solutions and relate the data they have to reach a conclusion.

**Our Aim**

Mathematics taught at English Martyrs should aim to promote a love for the subject. We aim to fulfil every child’s academic potential by developing a positive self-perception and esteem in the subject regardless of ability. We aim to work hand in hand with the ‘growth mindset’ principles so that all our pupils approach their work with a ‘can do’ mindset and not a ‘can’t do’ one. All children should be given the opportunity to ‘master’ the curriculum. To summarise, we aim to develop:

* A growth mindset about ability to learn mathematics
* A positive attitude towards mathematics and an awareness of how fascinating elements of mathematics can be
* Competence and confidence with numbers and the number system and other mathematical knowledge, concepts and skills
* Problem solvers, who can reason, think logically, work systematically and apply their knowledge of mathematics
* An ability to communicate using mathematical language
* An ability to work both independently and with others

The National Curriculum states:

"Mathematics is a creative and highly interconnected 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." [The National Curriculum 2014: Purpose of Study]

When pupils leave English Martyrs, they should have:

* become fluent in the fundamentals of mathematics through varied and frequent practice of increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
* the ability to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
* strategies to 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

[The National Curriculum 2014: Aims]

**How is Mathematics taught at English Martyrs?**

Mathematics is taught on a daily basis in individual year groups. Within these lessons there is a balance between whole-class work, group teaching and individual practice. Children also get many opportunities to practice a range of different skills including mental skills, written calculation, and problem solving and reasoning. A typical lesson includes:

* Mental and calculation practice
* Recapping of key skills
* Mathematical discussion using the language of explanation(Progression of Language) and correct terminology
* Teacher input (modelling and explanation) and pupil activity (group, pair or independent) around a main learning intention
* An opportunity to apply skills to a problem or investigation
* A chance for children to reflect on their learning

Links will also be made to mathematics where appropriate and possible within the wider curriculum allowing children the opportunity to practice their maths skills in a range of contexts.

All age groups should learn through the use of concrete and pictorial representations before moving into abstract concepts and so children should have access to a range of practical resources during mathematics.

We aim to deliver high quality maths lessons using the following key principles:

 

This approach has mathematical problem-solving at its heart and has three key principles. We teach children to:

1. **Use spoken and written**[**language**](http://toolkit.mathematicsmastery.org/training/view/27)**with confidence and clarity to explain and justify mathematical reasoning.**

Every lesson involves children explaining mathematics.

1. **Have a deep conceptual**[**understanding**](http://toolkit.mathematicsmastery.org/training/view/29)**of mathematical concepts.**

This is achieved through covering fewer topics in greater depth. Pupils master concepts rather than learning procedures by rote. They do this using concrete objects and pictures before moving to abstract symbols (numbers and signs).

1. **Develop**[**mathematical thinking**](http://toolkit.mathematicsmastery.org/training/view/28/principles/mathematical-thinking)**, including generalising, classifying and comparing, and modifying.**

**What is the White Rose Maths Hub Scheme?**

At English Martyrs, we use the White Rose Maths scheme to develop fluency, reasoning and problem-solving. The White Rose Maths Hub is one of 35 national Government-funded hubs working with hundreds of early years, primary and secondary schools across their assigned areas to raise standards and inspire children and their teachers about the power of maths. As a hub they have produced a series of learning schemes, assessments and teaching resources to support teaching for mastery. The schemes have proved extremely useful for hundreds of schools around the country in helping teachers understand what teaching for mastery might look like. The fluency, reasoning and problem-solving ideas exemplify what depth could look like for each area of mathematics.

**Teaching, Learning and Planning**

Planning begins from a thorough understanding of the children's abilities and knowledge taken from a range of assessment methods (formative and summative) combined with high expectations for all children. White Rose planning documents are used for medium-term planning. This ensures a thorough coverage of the national curriculum and a logical and progressive teaching sequence.

Short-term planning has well-pitched learning intentions with clear steps to success demonstrating what is needed for the child to achieve their learning intention. Teachers’ individual planning will display a clear and logical progression in learning. Teachers will adapt their planning through the week as necessary.

At the beginning of every topic, teachers must engage in pre-topic discussions to identify any misconceptions that children may have – e.g. a rectangle/oblong has four lines of symmetry (diagonals). Teachers also plan and include the vocabulary they will expect pupils to use and which models, images and concrete resources they will require to aid learning. Teachers will identify half termly opportunities to include maths in their topic work so that our pupils understand how maths permeates through real life. Effective plenaries are only part-planned as misconceptions may arise during the teaching of the lesson. However, all plenaries refer to the learning outcome and the success criteria in a meaningful way, allowing pupils some time for self-assessment.

We ensure that across each term, pupils are given a range of experiences in maths lessons e.g. practical activities and mathematical games; group problem-solving activities, individual, group and whole class discussion activities and open and closed tasks. We ensure that pupils can use a range of methods to calculate and have the ability to check whether their chosen methods are appropriate, reliable and efficient.

Problem-solving includes: word problems, problems from Oxford Owl (Mastery and Greater depth problems), nrich, Busy Ants and other sources teachers judge fit for purpose. Pupils will be provided with the opportunities to develop their skills within all areas of problem-solving.

A separate ‘Calculation Policy’ has been written by the White Rose Maths Hub and has been adopted in school to ensure complete continuity and gradual development of number skills.

**Differentiation**

Our staff have high expectations of all pupils, irrespective of ability and encourages them to be successful and achieve their full potential. Our aim is to ensure challenge for all. Pupils are encouraged to have a growth mindset about their ability to do mathematics. Encouraging pupils to ‘have a go’ is seen as paramount.

Where pupils are significantly below age-related expectations, learning is differentiated accordingly, allowing pupils to close gaps with extra support where necessary and with access to supporting equipment. This may mean that some pupils will require separate learning objectives. They must have also experience problem solving tasks at every appropriate chance.

Where children are significantly above age-related expectations, lessons are differentiated effectively to allow them to gain a greater depth of knowledge. Assistance is provided to staff where necessary, to support the teaching of maths at a deeper level. Pupils should not be moved onto the learning objectives of a higher year group as a means of extension.

We aim to develop the mantra that: **‘Mistakes are proof that you are trying.’**

In some lessons, pupils have the opportunity to ‘self-differentiate’ and choose the level of challenge right for them. In other lessons, teachers direct pupils to the correct level of challenge based on their assessment in the initial phases of the lesson.

 Differentiation of tasks is done in various ways:

* Open-ended questioning and activities which allow more able children to offer more sophisticated mathematical responses
* Stepped activities which can be accessed at different steps, supporting and challenge all
* Recording e.g. allowing some children to give verbal responses and photographing their learning
* Resourcing e.g. use of dienes, place value counters, 100 squares, number lines, mirrors to support some children
* Grouping according to ability so that the groups can be given different tasks when appropriate. Activities are based on the same theme. Part of independent work often involves some focused, targeted group work from the teacher. However, groupings are ‘fluid and flexible’ based on the needs of individual pupils.

**Recording work**

Mathematics work can be recorded in a variety of ways appropriate to the learning intention and activities taking place. Pupils’ work is presented in books in accordance with the school's Handwriting and Presentation policy. These include:

* Formal written work in pupils’ individual books
* Group worked carried out on large paper
* Whiteboard work
* Photos and annotations made by the teacher or the pupil

**Assessment**

We recognise that Assessment for learning (AfL) lies at the heart of promoting learning and in raising standards of attainment. We further recognise that effective AfL depends crucially on actually using the information gained.

* AfL (formative) should take place in all maths lessons in a range of different ways including: observation; questioning, discussion and bookwork
* Pupil work should be marked in accordance with the school's marking policy
* Pupils will be given the opportunity to provide their own feedback through self-marking recorded in their books with purple pen
* Provide the children with ‘next step’ marking which will record progression and pupil/teacher feedback when necessary
* Year 3,4 and 5 will use NFER at the end of every term
* Summative assessment will take place at the end of each half term using a combination of written assessments (White Rose and Mathletics) and teacher assessment using the Tower Hamlets Maths Toolkit
* All assessment will inform planning

**Parental Involvement**

We believe that parental involvement is key to reaching a child's potential. With this in mind, workshops are run for parents on key skills and key documentation such as the calculation policy and yearly overviews are available to parents. When homework is sent with a specific method in mind, a cover sheet may be provided to give guidance on how parents can support their pupils.

**Display and Resources**

Access to practical resources is essential to allow children to build a strong understanding of key mathematical concepts. All classrooms have crucial equipment to allow pupils the opportunity to use as when they need to. It is our aim to teach pupils how to choose appropriate equipment to support their learning and that by the time they leave our school, they will be confident in deciding what will help them as independent learners. As well as classroom equipment, other mathematical resources linked to specific mathematical areas such as measures are stored in a central location to allow easy access for all staff. It is the responsibility of all staff to ensure that equipment is looked after and stored correctly and that any problems or gaps in equipment are reported to the Maths Coordinator to allow them to be replaced. All classrooms should have a mathematics working wall displaying key vocabulary and supporting the mathematics being taught.

**Mathematics Interventions**

At English Martyrs, it is our firm belief that all pupils can achieve a good level of mathematics. Where children are below the age-related expectations and classroom differentiation is not appropriate, children are supported through intervention programs. The phase leaders and SENCO decide who will receive intervention in discussion with class teachers and those running the intervention. Interventions include:

* First class@ number
* First class@ number 2
* Rising Stars

Interventions may be run by teachers or trained support staff in small groups outside of daily maths lessons. The aim of intervention is to provide an intense, short course of lessons to allow the pupils to close gaps and catch up with their peers and are not intended for the long-term. Some pupils may require a more intense intervention taking them out of the maths lesson to provide them with 1:1 support.

**CPD**

Professional development is key to ensuring mathematics is taught effectively. Staff receive appropriate professional development where necessary and any training attended by staff is fed back to other members of staff.

**Role of the Maths Coordinator**

The role of the Maths Coordinator includes:

* Writing, monitoring and reviewing the mathematics action plan
* Monitoring the teaching and learning of mathematics across the school to ensure coverage of the national curriculum
* Ensuring teachers are familiar with planning documents and support in planning where necessary
* Preparing, organising and providing INSET for staff based on staff feedback and monitoring outcomes
* Working co-operatively with other curriculum leaders
* Attending INSET provided by outside agencies and feedback to staff
* Keeping up to date with progression in maths teaching, auditing, organising and ordering resources

**Homework**

* Mathletics is set weekly in accordance with the Homework Policy
* Homework is relevant to that week’s learning
* The homework will meet the specific learning needs of each individual pupils
* Additional paper homework may be provided as the teacher deems relevant

**Equal opportunities**

All pupils should have equal access to the curriculum, irrespective of particular circumstances such as race, background, gender and capability. In the daily maths lesson, we ensure this by supporting our pupils in a variety of ways: e.g. repeating instructions, emphasising key words, using picture cues.

**Vocabulary and precision of language**

Developing children’s language and vocabulary in mathematics is essential:

* In all lessons attention is given to whether key vocabulary has been learnt
* Key vocabulary is listed on vocabulary cards during lessons and instantly added to as new words arise
* Paired talk activities are used to encourage children to talk about their mathematics
* Teachers insist that children mirror the language they hear the adults
* 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 ‘3 times 5 is 15’, teacher says ‘yes, the product of 3 and 5 is 15’ or ‘3 multiplied by 5 equals 15’.
* Children are required to provide justification and reasoning for their answers. For example, ‘I know the 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 if unsure. E.g. there is no such thing as a ‘take away’ sum (because ‘sum’ means ‘add’). We use the terms ‘calculation’ or ‘equation’

**Monitoring, Support and Evaluation**

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| **When?** | **Aim** |
| Autumn A | Support with planning and preparation. |
| Autumn B | Subject Leader to review pupil books and feedback |
| Spring A | Maths Coordinator to collaborate with teachers on creating Maths Working Walls in all classrooms |
| Spring B | Lesson observations |
| Summer A | Support with end of year assessments and book review |
| Summer B | Looking to next year and evaluation. |

To be reviewed Sept 2021