

King Edwin Primary & Nursery School

Mathematics Policy

V.1



Rationale

At King Edwin Primary School we believe that Mathematics is a key skill that helps us to make sense of the world around us. 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 understand and apply their knowledge to solve real life problems.

At King Edwin we also believe that Mathematics equips children with a uniquely powerful set of tools to understand and change the world. These tools include logical reasoning, problem-solving skills and the ability to think in abstract ways.

Mathematics is important in everyday life, many forms of employment, science and technology, medicine, the economy, the environment and development and in public decision-making.

Aims

The national curriculum for mathematics aims to ensure that all pupils:

- 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
- can 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 interconnected 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.

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.

King Edwin's Aims:

- *Have a sense of the size of a number and where it fits into the number system*
- *Know by heart number facts, such as number bonds, multiplication tables*
- *Use what they know by heart to figure out answers mentally*
- *Calculate accurately and efficiently, both mentally and with pencil and paper, drawing on a range of calculation strategies*
- *Make sense of number problems, including non-routine problems, and recognise the operations needed to solve them*
- *Explain their methods and reasoning, using correct mathematical terms*
- *Judge whether their answers are reasonable, and have strategies for checking them where necessary*
- *Suggest suitable units for measuring, and make sensible estimates of measurements*
- *Explain and make predictions from the numbers in graphs, diagrams, charts and tables.*

Implementation of Policy

At King Edwin we use a variety of teaching and learning styles in mathematics lessons. Our principal aim is to develop children's knowledge, skills and understanding in mathematics.

We do this through a daily lesson that has a mix of whole-class and group teaching. During these lessons we encourage children to ask as well as answer mathematical questions. They have the opportunity to use a wide range of resources from our enable tables such as number lines, number squares, digit cards and small apparatus to support their work appropriate to their age and ability level.

At King Edwin Primary School, children use ICT in mathematics lessons where it will enhance their learning, as in modelling ideas and methods. All children have access to Doodle Maths where weekly homework is set. The homework will link to what the children are learning about in class. Key Stage 1 also have a Numbots login to help them with number sense and Key Stage 2 have a Times Table Rockstars login.

In all classes there are children of differing mathematical ability. Therefore, the children work through our stages of learning at their own pace. Children will stay on the practise and consolidation stage until they are ready to progress on to problem solving. We use classroom assistants to support targeted groups and to provide specific feedback to ensure that work is matched to the needs of individuals.

At King Edwin, we do this through careful planning and preparation, ensuring that throughout the school,

- *children are given opportunities for: practical activities and mathematical board games*
- *the development of mental and oral strategies with an emphasis on speed recall of number bonds and multiplication tables*
- *the development of mathematical vocabulary*
- *problem solving*
- *individual, group and whole class discussions and activities*
- *a range of methods of calculating e.g. mental, pencil and paper and using a calculator*
- *understand mathematics through a process of enquiry and experiment*

- *regular use of ICT games to reinforce, develop and enthuse learning*

The National Curriculum

The National Curriculum for Mathematics (July 2014) states that:

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 for Mathematics sets out programmes of study year-by-year for key stages 1 and 2. All schools are required to set out their school curriculum for Mathematics on a year-by-year basis and make this information available online. The Mathematics curriculum for this school is available in the curriculum section of the school's website.

The National Curriculum order for Mathematics describes what must be taught in each key stage. King Edwin follows the White Rose schemes of learning, which provide detailed guidance for the implementation of the orders and ensures continuity and progression in the teaching of mathematics.

Every teacher at King Edwin has an account for the White Rose website. This helps with the teaching of mathematics and has a curriculum map outlining progression. In early years, the curriculum is guided by the Early Learning Goals.

Early Years Foundation Stage

At King Edwin Primary School children follow the early years foundation stage curriculum. We give all children the opportunity to talk and communicate to practise and extend their range of vocabulary and numeracy skills. They have the opportunity to explore, enjoy, learn about, and use mathematics in a range of situations. Mathematics is planned on a weekly basis and assessed using the criteria from the Development Matters Document. The children are assessed against the Mathematics early learning goal at the end of Foundation 2 (reception year). Mathematics is taught both as a discrete subject and within the whole early years curriculum to give children opportunities to use their Numeracy skills in real life situations.

Key Stages 1 and 2

At King Edwin, daily maths lessons are around an hour long. Foundation 2, Year 1 and Year 2 also have an extra 15 minutes of Maths per day for their Mastering Number session as we are part of the NCETM's Mastering Number Embedding the impact programme. There are medium term plans for each half term's work. There are also weekly plans, which cover the daily content of each lesson.

Teaching Methods and Approaches

Whilst the basic lesson structure is as outlined below, teaching staff may adapt this form to reflect the age and needs of the children.

Starter (recapping units previously covered) - 5 minutes
Two oral and mental calculation activities - 20 minutes
Main teaching activity - 30 minutes
Review – plenary session - 5 minutes

Lessons will have clear learning objectives that are communicated to the pupils. All objectives from the National Curriculum will be taught, and wherever possible children will progress through the 6 Stages of Learning:

Stage 1: Teaching and Learning
Stage 2: Practice and Consolidation
Stage 3: Problem Solving
Stage 4: Reasoning
Stage 5: Hybrid
Stage 6: Mentoring

Some pupils may be accelerated through this process to ensure a greater depth of understanding and guarantee higher performing children are challenged. Some children may find practice and consolidation (Stage 2) a challenge, and so remain on this for longer to improve accuracy and fluency.

The teaching of Maths at King Edwin provides opportunities for:

- *Group work*
- *Paired work*
- *Whole class teaching*
- *Individual work*

Attainment Targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Key stage 1 - years 1 and 2:

- The principal focus of 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 4 operations.
- 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.

Lower key stage 2 - years 3 and 4:

- The principal focus of teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the 4 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.

Upper key stage 2 - years 5 and 6:

- The principal focus of 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 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Parental Involvement

At King Edwin Primary School, we recognise that parental involvement is an important factor in helping children achieve their best and actively encourage parents to become involved with their children's development in Mathematics through:

- *Parents' meetings twice a year, along with opportunities to look at children's work*
- *The school's 'open' attitude to visits from parents/carers, where teachers make themselves available whenever a discussion need is identified.*
- *STEM Week*
- *Use of the Homework Materials, maths games and subscription to Doodle Maths, Times Table Rockstars, Numbots and Purple Mash*

Wall Displays

At King Edwin, we recognise the important role display has in the teaching and learning of mathematics by having maths work displayed in the school. Every class has a 'Maths Working Wall' which is a visual aid to support children with their work. Our Maths working walls include examples of children's work, moving through the stages of learning. Methods for calculation will also be displayed which the children can use during their lessons.

Resources

At King Edwin Primary School resources for the delivery of the maths curriculum are stored both centrally in the corridor and in classrooms. Every classroom has an enable table set up with manipulatives appropriate to the year group they are in. 'Manipulatives Monday' is used to introduce the children to a new concept, the children will then move on to pictorial and abstract when they are confident with that particular area of Maths. Manipulatives are readily available in classrooms for the children to help themselves to when they feel they need them.

King Edwin uses a variety of materials to facilitate the teaching of mathematics but recognises the need for the teaching of maths to be investigative and grounded in real life circumstances wherever possible.

Staff have access to a variety of Maths planning resources including White Rose Maths, Target Maths, NRICH and Third Space Learning.

Contribution in Mathematics to Teaching in Other Curriculum Areas

English

At King Edwin, mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening.

Computing

At King Edwin Primary School, the effective use of computing can enhance the teaching and learning of mathematics when used appropriately. When considering its use, we take into account the following points:

- *Computing should enhance good mathematics teaching. It should be used in lessons only if it supports good practice in teaching mathematics;*
- *Any decision about using computing in a particular lesson or sequence of lessons must be directly related to the teaching and learning objectives for those lessons.*
- *Computing should be used if the teacher and/or the children can achieve something more effectively with it than without it.*

Science

At King Edwin Primary School, almost every scientific investigation or experiment is likely to require one or more of the mathematical skills of classifying, counting, measuring, calculating, estimating and recording in tables and graphs. In science children will for example order numbers, including decimals, calculate simple means and percentages, use negative numbers when taking temperatures, decide whether it is more appropriate to use a line graph or bar chart, and plot, interpret and predict from graphs.

Art, Design and Technology

At King Edwin Primary School, measurements are often needed in art and design and technology. Many patterns and constructions are based on spatial ideas and properties of shapes, including symmetry. Designs may need enlarging or reducing, introducing ideas of multiplication and ratio. When food is prepared a great deal of measurement occurs, including working out times and calculating cost; this may not be straightforward if only part of a packet of ingredients has been used.

History, Geography and Religious Education

At King Edwin Primary School, in history and geography children will collect data by counting and measuring and make use of measurements of many kinds. The study of maps includes the use of co-ordinates and ideas of angle, direction, position, scale and ratio. The pattern of the days of the week, the calendar and recurring annual festivals all have a mathematical basis. For older children historical ideas require understanding of the passage of time, which can be illustrated on a timeline, similar to the number line that they already know.

Physical Education and Music

At King Edwin Primary School, athletic activities require measurement of height, distance and time, while ideas of counting, time, symmetry, movement, position and direction are used extensively in music, dance, gymnastics and ball games.

Assessment and Record Keeping

At King Edwin Primary School, we are continually assessing our children and recording their progress. We see assessment as an integral part of the teaching process and endeavour to make our assessment purposeful, allowing us to match the correct level of work to the needs of the children, thus benefiting the children and ensuring progress.

Assessment is integral to high quality teaching and learning. It helps us to ensure that our teaching is appropriate and that learners are making expected progress. We also use the outcomes of assessment to check and support our teaching standards and help us improve. Children are assessed regularly in class, teachers assess where the children are with our stages of learning daily. Children will stay on stage 2 (practise and consolidation) if they are not secure within an objective. If children are confident with the practise and consolidation stage they will move on to problem solving and then through the rest of the stages.

At the end of every term, pupils take a NFER Maths assessment test which includes an arithmetic and two reasoning papers (Years 1, 3, 4 and 5). As Year 2 and Year 6 are SATs years, the children complete past SATs papers as part of their assessment. This assists teacher's judgements of whether the pupils are making good progress. This score is used in conjunction with more formative assessment methods conducted on a daily/weekly basis. Teachers will decide whether a pupil is working below the expected level, working towards the expected level, working at the expected level or performing at a Greater Depth standard.

Reporting

At King Edwin, parents also have opportunities to discuss their child's Maths progress at two parent's evenings during the year. Mathematics is also reported on in the children's end of year reports. The reports indicate the children's attitude and effort towards Mathematics along with their attainment. A target will also be identified for the child to work on next year.

Special Educational Needs

At King Edwin wherever possible we aim to fully include SEND children in the daily mathematics lesson so that they benefit from the emphasis on oral and mental work and by listening and participating with other children in demonstrating and explaining their methods.

Where necessary teachers will identify specific targets in consultation with the SENCo. If a child's needs are particularly severe, they will work on an individualised programme written in consultation with the appropriate staff. When planning teachers will try to address the child's needs through simplified or modified tasks or the use of support staff where appropriate.

Role and Responsibilities of Mathematics Subject Leader

- *Monitor planning, teaching and learning in mathematics, to ensure continuity and progression.*
- *Monitor standards in mathematics throughout the school*
- *Identify strengths and areas for improvement and to lead and drive improvements within the school.*
- *Keep up to date with new initiatives and train staff on these*
- *Feed back to the Headteacher on standards in mathematics*

Monitoring and Review

At King Edwin Primary School the subject leader supports colleagues in their teaching, by keeping them informed about current developments in mathematics, and by providing a strategic lead and direction for this subject.

The Maths lead uses allocated management time to review evidence of the children's work and to observe mathematics lessons across the school. A named member of the school's governing body (Bev Cary) is briefed to oversee the teaching of mathematics. The mathematics link governor meets regularly with the subject leader.

Pupils books will be regularly monitored (once a term) in a book scrutiny. An outline of aims and expectations will be outlined to staff prior to the scrutiny. Staff will have a professional dialogue with another member of staff, sharing good practise and widening their understanding of the Mathematics curriculum.

This policy will be reviewed in the Autumn Term of 2024.

Any questions or concerns regarding this policy should be made to Samantha Hawkins, Andy Callaghan-Wetton or Phil Jones.