

# Curriculum Purpose & Rationale

## Mathematics





## Curriculum Purpose: Why study Mathematics at Kings?

### Why do students at Ark Kings need to study Mathematics?

Pupils in our community often see Maths as 'times tables and the four operations'. They are unable to make links with how the skills they are learning are relevant to their lives now and in the future. By studying Maths at our school, pupils will become quick computational mathematicians, which will enable them to tackle more complex problems with ease and solve reasoning problems. At this stage, pupils will see the value in using Maths as a tool for solving problems.

### What are the aims for the Mathematics curriculum?

#### (i.e. What do we want students to be able to know and do by the time they leave Ark Kings Primary?)

- To become fluent mathematicians with the ability to develop number sense and choose the most appropriate method for the task at hand
- To be able to apply a skill to multiple contexts
- To solve sophisticated problems in unfamiliar contexts

### National Curriculum:

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.

### What values underpin the curriculum content?

Resilience: pupils accept mathematical problems with enthusiasm because they are resilient and able to overcome challenges. They apply their knowledge of mathematical concepts in problem solving situations in order to be successful.

### How are British Values taught through Mathematics?

Group work encourages students to work as part of a team and helps them understand how different people solve problems in various ways. This also promotes the British values of mutual respect and support for one another. Whilst investigating and applying Maths to a range of



situations, tolerance and resilience are promoted as students are encouraged to persevere, take risks and try different methods.

**What links to careers can be made within the Mathematics curriculum?**

Accountant, Accounting technician, Actuary, Auditor, Bank manager, Banking customer service adviser, Bookkeeper, Business development manager, Credit controller, Quantity surveyor, Research scientist (maths), Software developer, Statistician, Systems analyst



### Curriculum Rationale: Why study Mathematics in this way?

#### **Why has the specific content/ domain knowledge been selected?**

Within each year group, pupils are taught place value to give them a firm understanding of number. They then use this knowledge in solving calculations and problems around the four operations. After having studied the four operations, pupils have a knowledge of division and therefore embark on work around fractions. Pupils then study content around geometry and measure to develop and extend their knowledge of number.

#### **Why is it taught in the order that it is?**

Across a unit and within lessons, pupils are taught to become fluent in calculations and times tables. The mastery approach to the curriculum means that children practise until they are confidently calculating. Fluency in calculations leads to pupils tackling problems with greater confidence and resilience because they are no longer having to tackle remembering 'how' to do the calculations needed; they are now able to put all their energy into 'how' to solve a problem.

#### **How are Mathematics lessons delivered at Kings?**

Pupils have the opportunity to practise arithmetic in every lesson. This is to embed this skill into the long-term memory, allowing children to focus on approaching problems when confronted with them.

All pupils, when introduced to a key new concept, have the opportunity to build competency in this topic by taking the concrete, pictorial, abstract approach. Pupils are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols.

Concrete – children have the opportunity to use concrete objects and manipulatives to help them understand and explain what they are doing.

Pictorial – children then build on this concrete approach by using pictorial representations, which can then be used to reason and solve problems.

Abstract – With the foundations firmly laid, children can move to an abstract approach using numbers and key concepts with confidence.

#### **What is the impact?**

- Quick recall of facts and procedures
- The flexibility and fluidity to move between different contexts and representations of mathematics.
- The ability to recognise relationships and make connections in mathematics

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.



## Mathematics Curriculum Aims

### What are the aims of specific stages of the curriculum?

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.

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.

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.

See Primary National Curriculum for yearly breakdown of content.

