Mathematics Policy

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.

Aims

The National Curriculum for Mathematics (2014) 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.

The content and principles underpinning the mathematics curriculum reflect those found in high performing education systems internationally, particularly those of east and south-east Asian countries such as Singapore, Japan, South Korea and China. The principles and features that characterise this 'mastery' approach are:

- Teachers reinforce an expectation that all pupils are capable of achieving high standards in mathematics.
- The large majority of pupils progress through the curriculum content at the same pace. Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.
- Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to foster deep conceptual and procedural knowledge.
- Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts in tandem.
- Teachers use precise questioning in class to test conceptual and procedural knowledge, and assess pupils regularly to identify those requiring intervention so that all pupils keep up.

Mathematics Curriculum

The Foundation Stage

In the Early Years Foundation Stage (EYFS), we relate the mathematical aspects of the children's work to the Development Matters statements and the Early Learning Goals (ELG), as set out in the EYFS profile document. Mathematics development involves providing children with opportunities to practise and improve their skills in counting numbers, calculating simple addition and subtraction problems, and to describe shapes, spaces, and measures. The profile for mathematics areas of learning are number (ELG 11) and shape, space and measures (ELG 12)**.** We continually observe and assess children against these areas using their age-related objectives, and plan the next steps in their mathematical development through a topic-based curriculum.

Years 1 to 6

- Through Years 1 to 6 we use a coherent programme of high-quality materials and exercises, which are structured with great care to build deep conceptual knowledge alongside developing procedural fluency.
- Our KS1 and KS2 teachers use textbooks and workbooks from the 'Maths - No Problem!' series, which is based on the principles of how mathematics is taught in Singapore and aligned with the National Curriculum 2014, to support their planning and delivery of mathematics teaching.
- The 'Maths - No Problem!' textbooks and workbooks are arranged in chapters and, over the course of the academic year, all units of the National Curriculum 2014 are covered.
- The short term planning is done weekly, with teachers planning learning intentions, 'Steps to Success', identifying possible misconceptions, key vocabulary and ways to challenge pupils.
- If the needs of the children are best met following an alternative plan, which deviates from the National Curriculum 2014, then the class teacher and the SENCO/Phase/Subject Leader discuss this and decide on a way forward.

A Typical Lesson – Maths No Problem

Lessons last approximately one hour and are taught daily in the morning. Pupils start the lesson with an 'In Focus' problem, which they discuss in partners. This is a problem-solving activity, which prompts discussion and reasoning. In Key Stage One, these problems are almost always presented with objects (concrete manipulatives) for children to use. Pupils may also use manipulatives in Key Stage Two. Teachers use careful questions to draw out pupils' discussions and their reasoning.

The class teacher then leads pupils through strategies for solving the problem, including those already discussed. At this part of the lesson, the children might need to write down their strategy in their 'Maths Journal'. The strategies may be displayed on sheets of paper in the classroom.

The class then try some questions in 'Guided Practice'. Carefully designed variation in these questions builds fluency and deep understanding. When they are ready to apply their learning independently, the children answer questions in their own workbook. If some children are not ready by this point, they will continue 'Guided Practice' with the teacher in a small group. If some pupils are advanced in this area of mathematics and have completed the questions independently, they will be given extra tasks to consolidate and deepen their learning, which they will complete in their 'Maths Journal'.

Calculation policy

As a school we believe that all children, when introduced to a key new concept, should have the opportunity to build competency in this topic by using the CPA approach (Concrete, Pictorial, and Abstract).

Concrete – students should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.
Pictorial – students should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.
Abstract – with the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.

Resources

The use of mathematics resources is integral to the CPA approach and thus planned into our learning and teaching. Resources such as number lines, Numicon, multi-link cubes, dienes, hundred squares, shapes, etc. are located within individual classrooms. Resources within individual classes are accessible to all pupils who should be encouraged to be responsible for their use. Further resources (often larger items shared by the whole school) are located in the Work Room. A range of mathematics related software is also available and this is accessible via the shared server, which children can access when projected onto the Interactive Whiteboards in each classroom; by using individual iPads or by using the ICT suite. Teachers are encouraged to use the school playgrounds as an outdoor classroom when possible, for example, when teaching length, area or perimeter.

Each child in Years 1 to 6 has access to the subscription only Mathletics website, which they can access at home or at school to support their learning in Mathematics. The website follows and supports the National Curriculum 2014 and learning can be child lead or teacher lead, with individual teachers setting work for the children, which appears when they access the website.

Display

We recognise the importance of a stimulating learning environment. The school provides an environment which is rich in a wide variety of print, pictures, diagrams, charts, tables, models and images. Each classroom has a mathematical display area, which includes a working wall and a challenge area with mathematical vocabulary, visual aids and interactive activities where appropriate.

Contribution of Maths to teaching in other curriculum areas

Mathematics is a tool for everyday life. It is a network of concepts and relationships and is used to analyse and communicate information and ideas in practical tasks and problems. By making links to other subjects at the initial planning stage we aim to provide real context in which to apply skills taught during the maths lessons.

Pupil Support and Differentiation

Taking a mastery approach, differentiation occurs in the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. The National Curriculum states:

'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.'

There is little differentiation in the content taught but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems which deepen their knowledge of the same content. Pupils' difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention – commonly through individual or small group support later the same day.

Inclusion

At Allerton CE Primary School we teach mathematics to all children, whatever their ability. Inclusive practice in mathematics should enable all children to achieve their best possible standard; whatever their ability, and irrespective of gender, ethnic, social or cultural background, home language or any other aspect that could affect their participation in, or progress in their learning.

Monitoring and review

Monitoring of the standards of the children's work and of the quality of teaching in mathematics is the responsibility of the Mathematics Subject Leader in cooperation with the Head Teacher. The work of the Subject Leader also involves supporting colleagues in the teaching of mathematics and being informed about current developments in the subject. The Head Teacher and Subject Leader provide the strategic lead and direction for the subject in the school.

Roles and responsibilities

The Subject Leaders are responsible for:

- Monitoring the teaching of mathematics throughout the school (informing the Head Teacher of findings)
- Scrutiny of planning
- Advising staff
- Resourcing

November 2016

This Policy has been drawn up and written by the School Council and staff. This will be reviewed when updated legislation or guidance is issued by the DfE, Local Authority or other relevant organisation.

This will be reviewed annually by the Governing Body.

Drafted by: Sarah Bell
Date: Annually