



## MATHEMATICS POLICY

### INTENT

We know that our children start school with different levels of maths understanding. Our curriculum is designed to ensure that all children have access to progressive, creative and engaging opportunities in maths; preparing them for their future as a lifelong learner.

Specific language development and practical experiences in maths will enable them to become "deep thinkers" acquiring maths skills that can be recalled quickly and transferred and applied in different contexts.

The challenges presented in maths will enable children to become resilient, making clear connections across the areas of maths, using their knowledge in other subjects and in their everyday lives.

### IMPLEMENTATION

Mathematics must be an experience from which pupils derive pleasure, enjoyment and a positive attitude towards mathematics. Mathematics should provide a source of delight and wonder offering pupil's intellectual stimulation and develop a positive attitude towards mathematics as an interesting and creative subject.

We aim to inspire all children to reach their full academic potential. In mathematics, this means ensuring a curriculum that is fully inclusive of all children which develops:

- A positive attitude towards mathematics and an awareness of the fascination of mathematics;
- Fluency, reasoning and mastery in mathematical knowledge, concepts and skills;
- An ability to solve problems, to reason, to think logically and to work systematically and accurately;
- Initiative and an ability to work both independently and in co-operation with others;
- An ability to communicate mathematics;
- An ability to use and apply mathematics across the curriculum and in real life;

- An understanding of mathematics through a process of enquiry and experiment.
- To follow the agreed methods of calculation for all four operations. (See calculation policies)
- Opportunities for all children within the school to develop their full potential in mathematics.

This policy is set within the context of the schools' vision, aims and policy on teaching and learning. As a result of their learning in mathematics and problem solving across the curriculum children will:

- Be prepared for applying their skills effectively in everyday life situations, in their future learning and in the work place.
- Have the building blocks in place and to provide a solid foundation to lead onto secondary, further and higher education.

Through teaching with a problem solving approach, children will learn to understand, distil and clarify information; consider what they know that will help them to solve problems, realise what they need to know next; create systems and strategies, organising information in a way that helps find patterns and ultimately solutions and to communicate and present their findings effectively.

### **Strategy for implementation.**

Mathematics is a National Curriculum core subject. Within the new National Curriculum (2014) the subject is divided into the following areas:

- Number - number and place value
- Number - addition, subtraction, multiplication and division
- Number - fractions
- Measurement
- Geometry - properties of shapes
- Geometry - position and direction
- Statistics- data/bar graphs

Opportunities for using and applying mathematics exist throughout all the strands.

### **Teaching and learning**

The school uses a variety of teaching and learning styles in mathematics lessons. Our principal aim is to develop children's knowledge, skills and understanding in mathematics, allowing children to become fluent in the fundamentals of mathematics. We do this through a daily lesson which contains whole class teaching, group work and

independent learning. The use and application of mathematical principles underpins the whole of mathematical teaching and learning. Opportunities are given for pupils to apply their knowledge to a wide range of real life situations. They need to be able to choose appropriate equipment and methods for the task and to communicate and justify their findings in a manner appropriate to their age and ability, showing increasing concern for clarity and accuracy of meaning. The children will record their work in appropriate ways for a variety of purposes. We use the 5 and apply methodology to ensure practice of basic skills moves children quickly onto application tasks, including reasoning questions.

### **Foundation Stage**

Teaching and learning promotes social skills and develops the mathematical understanding of young children through stories, songs, rhymes, finger games, board games, sand and water, construction on a large and small scale, imaginative play, outdoor play, cooking, shopping, 2D and 3-D creative work with a range of materials and by observing numbers and patterns in the environment and in daily routines. Practical equipment is used to support the teaching and learning of number calculation. Daily use of the outdoor environment supports basic understanding of number, shape space and measure.

### **Key Stage One**

Mathematics lessons may have a structure of:

- An oral and mental starter for 10 minutes
- The main activity, including exposition and application tasks, for about 30 minutes
- The plenary session for approximately 10 minutes

This structure can be adapted to reflect the needs of the class. The teacher will give demonstrations and explanations, with an emphasis on the use of appropriate mathematical language. Mental calculation is a key feature, with children being taught a range of strategies to work out answers as well as learning the quick recall of simple mathematical facts. Teaching is interactive, supported by practical equipment when appropriate and may also involve:

- Whole class and group discussions
- Practice to consolidate specific skills
- Problem solving and investigational activities in order to learn how to break down a problem
- Reasoning challenges
- Practical activities
- Mathematical games and puzzles

In some year groups setting may occur to meet the needs of the children. This may be into two or three groups across the year group.

## **Key Stage One**

Mathematics lessons may have a structure of:

- An oral and mental starter for 10 minutes
- The main activity, including exposition and application tasks, for about 40 minutes
- The plenary session for approximately 10 minutes

This structure can be adapted to reflect the needs of the class. The teacher will give demonstrations and explanations, with an emphasis on the use of appropriate mathematical language. Mental calculation is a key feature, with children being taught a range of strategies to work out answers as well as learning the quick recall of simple mathematical facts. Teaching is interactive, supported by practical equipment when appropriate and may also involve:

- Whole class and group discussions
- Practice to consolidate specific skills
- Problem solving and investigational activities in order to learn how to break down a problem
- Reasoning challenges
- Practical activities
- Mathematical games and puzzles

Lessons are differentiated through the use of tiered success criteria where 'gold' is the expected level for the year group the children are in. Children may start at a lower level but the opportunity to work up through the levels should be available to them. Children already working at 'gold' level can move onto 'platinum' level where further opportunities to apply their skills through reasoning are available.

Bi-weekly assertive mentoring and arithmetic tests are undertaken and reviewed as part of test technique sessions and provide children with opportunities to review skills previously taught.

## **Key Stage Two**

Mathematics lessons may have a structure of:

- An oral mental starter
- The main activity, including exposition and application tasks, for about 40 minutes, which may be several short tasks where the children are brought back to exposition as they move through them.
- End of lesson - reviewing understanding and assessing misconceptions for future teaching.

This structure can be adapted to reflect the needs of the class. The teacher will give demonstrations and explanations, with an emphasis on the use of appropriate mathematical language. Mental calculation is a key feature, with children being taught a range of strategies to work out answers as well as learning the quick recall of simple

mathematical facts. Teaching is interactive, supported by practical equipment when appropriate and may also involve:

- Whole class and group discussions
- Paired work
- Practice to consolidate specific skills
- Problem solving and investigational activities in order to learn how to break down a problem
- Reasoning challenges
- Practical activities
- Mathematical games and puzzles

Lessons are differentiated through the use of tiered success criteria where 'gold' is the expected level for the year group the children are in. Children may start at a lower level, but the opportunity to work up through the levels should be available to them. Children already working at 'gold' level can move onto 'platinum' level where further opportunities to apply their skills through reasoning are available. We use STEM sentences to support the children's understanding of the key vocabulary within each maths lesson and to understand the concepts behind the vocabulary.

At each level of learning, there will be opportunities to solve problems, including reasoning. Each week, a guided reasoning session is taught which models for the children how to break down problems in order to be able to see the mathematical concepts within them.

Bi-weekly arithmetic tests are undertaken and reviewed as part of test technique sessions and provide children with opportunities to review skills previously taught and learn new arithmetic skills throughout the term.

As a response to COVID-19 and learning which may have been missed as a result, catch-up maths sessions take place each week to support the learning of key knowledge.

## **Resources**

Maths resources are stored within each learning area and resource room labeled for easy access. The use of the CPA approach to support children's learning is a key factor to children understanding various mathematical areas. All classrooms have interactive whiteboards on which games and interactive programs can be used. Mathematical equipment is available in all classrooms where necessary. It is the responsibility of the subject lead to ensure all resources are kept up to date by completing a resource audit at the end of the academic year.

### **Online Apps- Numbots and Times Table Rockstars**

Children at the Infants all have the opportunity to support their learning through the online app 'Numbots.' This is an online game that when played little and often will significantly improve a child's recall and understanding of number bonds and addition and subtraction facts. These are critical foundations in mathematics. It was designed with the Mastery approach in mind. The children are able to move through the games completing the different levels in the stage becoming more confident as they go.

Children in Year 2 also benefit from the TT Rock Star Programme. It is a structured sequenced games that allows the child master their times tables.

At our junior school, TT Rock Stars is used in every year group and a half termly league has been created to encourage the children to access the programme more often, including time spent on it outside school hours, at a targeted club or at home. This league encourages all levels of ability as it focuses on the time spent on the programme rather than being the best at times tables.

### **Mathematics Curriculum Planning**

Mathematics is a core subject in the National Curriculum and we use the National Curriculum as the basis for implementing the statutory requirements of the programme of study for mathematics.

Long-term planning gives an overview of the coverage of maths topics across a school year. Due to COVID-19, this long-term plan has been adapted to meet the needs of each year group, using the NCETM Ready to Progress documents to focus on the key knowledge that the children need in order to move forward in their learning in the next year group.

Medium-term forecast plan gives details of the main teaching objectives for each term and define what we teach with reference to the area of mathematics. They ensure an appropriate balance and distribution of work across each term. These plans are kept by both the class teachers and the subject leader.

It is the class teacher who completes the weekly plans for the teaching of mathematics. These weekly plans list the specific learning objectives for each lesson and give details of how the lessons are to be taught. The class teacher keeps these individual plans, and the class teacher and subject leader can discuss these on an informal basis.

Application opportunities, including reasoning challenges, are planned for each lesson and are clearly evident on planning.

Catch-up plans have been created to ensure that any objectives missed due to the COVID-19 pandemic lockdown will be addressed within the next two years of maths teaching.

At our junior school there will also be three stand-alone catch up sessions during the afternoons each week to ensure that these objectives can be addressed sufficiently.

### **Power Maths/White Rose Schemes of Work**

The school has recently purchased the Online Power Maths resource. This is a whole class mastery programme that aims to ignite a child's curiosity about maths. Our hope is to support all children to develop and improve their confidence and enjoyment of maths. This programme is closely linked to the White Rose Resources that are already being used by our teachers in their planning. This programme will support the teachers and support staff with the planning of lessons and how to further develop the greater depth children within their class.

### **Assessment**

Assessment is an integral part of the teaching and learning process. Assessment is used to inform planning and to facilitate differentiation. The assessment of children's work is on-going to ensure that understanding is being achieved and that progress is being made.

Feedback is given to the children as soon as possible, and marking work will be guided by the school's **Marking Policy**.

- This aims to encourage and to give guidance for future work.
- Ticks and written comments are clear, with errors indicated.
- Some marking will be immediate, depending on the activity.
- Displays of mathematical work reinforce mathematical concepts, assist in learning and celebrate achievement.
- Oral feedback is given to enhance understanding.
- Close the gap marking is consistent throughout all year groups.

### **Summative assessment**

In Maths we use assessment to:

- Check mathematical understanding,
- Identify misconception,
- Set targets for future success,
- Raise self-esteem,
- Provide motivation.

## **Foundation Stage**

- Tapestry
- Long observations
- Assessment Document
- Specific areas in the EYFS
- Power Maths End of Unit Assessments
- Numbots Statistical Analysis

## **In Key Stage 1**

- Stoke Pathways assessment
- White Rose assessment
- PUMA assessments
- Key Stage 1 SATs
- NFER Termly Assessments
- Power Maths End of Unit Assessments
- Numbots/TT Rockstars Statistical Analysis

## **In Key Stage 2**

We are currently reviewing the following summative assessment systems to find the one which gives the most accurate level of attainment.

- Bi-weekly arithmetic tests (to ensure arithmetic skills are continually focused on)
- White Rose Termly test (before assessment point to support teacher judgments)
- NTS tests (at the end of the term to give a standardized score, allowing for comparison to previous tests and to check for retention for skills and gives an analysis of gaps)
- GL Tests (at the end of the school year to provides us with a nationally comparable standardised score)
- Key Stage 2 SATs (at the end of the Key Stage)
- TT Rock Stars data is also analysed termly

## **Monitoring**

Monitoring of the standards of children's work and of the quality of teaching in mathematics is the responsibility of the mathematics subject leader alongside the senior leadership team. The work of the mathematics subject leader also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The mathematics subject leader gives the Head teacher a termly summary in which she evaluates strengths and weaknesses in the subject and



indicates areas for further improvement. This is then reported to governors during the termly governor's reports. A named member of the school's governing body is briefed to oversee the teaching of numeracy. This governor meets with the subject leader to review progress. Subject Lead shares current action plan with governors and SLT team.

Monitoring consists of;

- Book scrutinies
- Lesson observations (formal and drop-in)
- Pupil discussions
- Moderation (internal and external)
- External teaching reviews

All class teachers and support staff will be given a copy of 'The Consistency Document' (See Appendix). This document will outline a set of non-negotiables that all members of staff will follow to allow for consistency in Maths across the school. The document sets out clear guidance related to specific areas when teaching Maths. These include, to name a few; planning, working walls, schemes of work, assessment and the presentation in children's books. The subject leader will monitor this every half term and give support to colleagues when needed.

### **ICT**

The use of ICT is an integral part of mathematics teaching and learning. The teaching of mathematics is supported by a range of ICT software and activities. This provides tools for assessment, planning and teaching and learning. Staff make use of online resources, software and hardware to enhance their teaching and learning. A wide range of ICT software is available for pupils to use to reinforce concepts, to provide investigational activities and to demonstrate new concepts. In EYFS, teachers have been provided with Ten Town interactive Program. This program is already implemented and enjoyed by every pupil.

### **Maths across the Curriculum**

Although the mathematics curriculum is organised as a discrete subject, there are many potential cross-curricular activities, linked closely to the topic for that term. Making links between areas of learning deepens children's understanding by providing opportunities to reinforce and enhance learning.

Learning is enhanced by:

- Giving further opportunities to practice taught skills through purposeful use in other curriculum areas;
- Providing real experiences, context and meaning for the development of core mathematical skills;
- Assisting memory through providing opportunities for children to use skills in a different context;

- Providing opportunities for the application of knowledge in new contexts, to involve children in higher order thinking skills, such as reasoning and problem solving;
- Providing opportunities for learners to recognise and develop key aspects of learning, e.g. looking for patterns and relationships, problem solving and reasoning;
- Building concepts by providing children with opportunities to meet the same or related information in different ways, adding to the richness of their experience.

### **Parent Involvement**

Reporting to parents is carried out through the parent / teacher consultation meetings and annually through the written report. They are provided with information on children's areas of strength and / or weakness and on their rate of progress in mathematics. Any specific areas of difficulty or clarification can be discussed with the parents on an informal basis. Parent workshops take place across the federation and are run by the maths leader.

### **Inclusion**

At Alexandra Infants' and Junior School, it is our belief that all children have an equal right to a broad and balanced curriculum, which enables them to meet their full potential. Through our teaching we provide learning opportunities that enable all pupils to make good progress. We strive hard to meet the needs of those pupils with special educational needs, those with disabilities, those who are deemed more able and talented and those learning English as an additional language, and we make all reasonable adjustments to achieve this. For further details, see separate policies: Special Educational Needs; SEND Information Report; Equality policy and scheme; Able and Talented; English as an Additional Language (EAL).

As a school we strive to ensure that all children, staff and members of our school community are treated fairly and equally. All children have equal rights to access all areas of the curriculum, regardless of race, gender, religious beliefs, sexual orientation and disability. Within this subject area, the Senior Leadership Team (SLT) and all staff endeavor to provide the appropriate provision for this to occur. This policy follows the guidelines and practices that are stated and outlined in Alexandra Infants' and Junior Schools Equality Scheme. Please see this policy for further detail.

## **Policy monitoring and review**

The Maths subject leader is responsible for the monitoring and implementation of this policy. The subject leader reports on the effectiveness of the policy to the head teacher and the governing body.

## **Learning Recovery**

In light of missed learning due to COVID 19, recovery provision has been planned for and is detailed in specific year group catch up plans. These have been formulated through collaboration of SLT, subject leaders, teachers and across the Key Stage with the feeder Infant School. These plans will be reviewed, modified and RAG rated regularly to inform future teaching & learning. For further detail please see each year group's separate plans.

This policy will be reviewed annually.

Subject lead: Emma Decicco (Infants) Stephanie Barnett (Juniors)

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