



# Mathematics Policy

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## **Rattlesden C of E Primary Academy- Mathematics Policy- 2021-22**

### **Introduction**

Mathematics is a powerful means of communicating information that is universally understood around the globe. Mathematical skills are necessary for adult life and therefore form an essential part of every school's curriculum. Mathematics also underpins and supports other subjects such as science, technology and data handling in many other subjects. Many people also gain great satisfaction and a feeling a well-being and achievement from solving mathematical puzzles and problems.

This policy outlines the teaching, organisation and management of Mathematics learnt and taught at Rattlesden Primary Academy.

### **Aims**

At Rattlesden Primary School we aim to develop:

- a positive attitude towards mathematics;
- a deep understanding of mathematical concepts;
- an appreciation of the creative aspects of mathematics and an awareness of its aesthetic appeal;
- an ability to think clearly and logically;
- the ability and confidence to use mathematics beyond the classroom, in practical everyday situations;
- perseverance when investigating a problem;
- an appreciation of mathematical pattern and relationship and;
- an ability to use number and computation skills with speed and accuracy.

In terms of mathematical skills we want all children to be able to:

- understand basic concepts and the relationships between concepts;
- access a variety of representations, both external and internal;
- communicate mathematics confidently in oral and written forms;
- remember basic number facts, mathematical vocabulary and notation;
- conjecture, and convince others of their ideas;
- gather, present and interpret data effectively;
- use calculators and computers confidently;
- use the mathematics they have learned in a range of contexts;
- develop perseverance and commitment through mathematics;
- take pride in their presentation and their achievements and;
- identify and celebrate the achievements of others.

Above all we hope to create an atmosphere that will encourage children to enjoy mathematics, and develop a lifelong interest in the subject.



## **Curriculum Content and Progression**

Mathematics is a core subject within the National Curriculum. At Rattlesden Primary School, the National Curriculum is used as a basis for all our maths planning. All teachers use the White Rose Maths scheme as a starting point for their planning and this ensures progression by making it clear what is to be taught each year.

## **Curriculum Organisation**

### **The Early Years Foundation Stage Curriculum**

The mathematics curriculum for Willow Class (Reception/Yr 1) is based upon the Early Learning Goals for the Foundation Stage in the areas of Numbers and Shape, Space and Measures. Learning is focussed on the six key areas of: cardinality and counting, comparison, composition, pattern, shape and space, and measures. Mathematical development at this stage depends on becoming confident and competent in learning and using key skills. This area of learning includes counting, sorting, matching, seeking patterns, making connections, recognising relationships and working with numbers, shapes, space and measures. Mathematical understanding is developed through stories, songs, games and imaginative play, to enable children to enjoy using and experimenting with numbers.

### **Key Stage 1 Curriculum**

There is an expectation that KS1 children will spend between 45-60 minutes per day studying maths in a designated lesson. In addition, maths may be related to other subjects via cross-curricular links. Pupils study: number, measurement, geometry and statistics (Statistics is taught from year 2 onwards).

### **Key Stage 2 Curriculum**

There is an expectation that KS2 children will spend approximately 60 minutes per day studying maths in a designated lesson. In addition, maths may be related to other subjects via cross-curricular links. Pupils study Number, measurement, geometry and statistics.

Pupils across the school also develop their spoken language in mathematics through a range of talking activities: explaining, conjecting, deducing, predicting and reasoning.

### **Teaching and Learning Strategies Planning**

The National Curriculum provides a solid and rigorous structure to the teaching of mathematics. Continuity is ensured and progression is built in. All teachers follow the National Curriculum closely, using their professional judgement. Topics are therefore covered in short sequences of lessons, and then revisited at a later date. By referring to their records of ongoing assessments, teachers are able to follow on at the appropriate level when the topic is revisited. Teachers plan daily lessons, specifying the work to be covered in each area of the lessons. These are then evaluated and filed, with the Subject Leader for Mathematics and the head teacher having access for monitoring purposes. The head



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teacher and/or the Subject Leader for Mathematics regularly monitor the maths teaching within the school by observing classes, planning and by collecting samples of work from all classes.

### **Teaching Methods**

All lessons should include opportunities for oral and mental maths. Usually there will also be whole class instruction, and pupils will then work on assigned tasks, individually, in pairs, or small groups, as directed by the teacher. At the end of the lesson, the teacher often brings the children together for a plenary session where the children and the teacher discuss the outcomes of the tasks, any difficulties encountered, and to clarify any misconceptions. Next steps and extension tasks can also be discussed at this point.

### **Key Skills**

The five key skills of Investigating, Problem Solving, Communicating, Creating and Evaluating are as vital in maths as they are in other subjects, for example: open-ended investigative activities provide opportunities for children to pursue their ideas without the pressure of having to find the 'right answer'. Children learn how to solve a range of mathematical problems and strategies they can use if they get stuck. Partner and small-group work highlight the need for clear communication of mathematical concepts as children are encouraged to explain their thinking. Pattern is an area of maths that can easily lead to creativity and aesthetic appeal. Evaluating the effectiveness of different strategies can lead to the selection of more efficient calculation methods.

### **Differentiation**

To enable teachers to differentiate effectively the children might be grouped together by ability and, generally, it is anticipated that up to three levels of work will be set. Where possible, pupils self-assess themselves and select their own work. However, all the children in the class will usually be covering the same topic. Groupings are flexible so that if a child struggles or excels in any particular area, their needs are addressed. Many tasks are 'high challenge, low threat', which means that a task may be open-ended and that pupils can access it on their own level and judge for themselves how quickly they can work through it.

### **Spoken Language**

Mathematical language underpins mathematical understanding so it is essential for children to be encouraged to both learn and use mathematical terms appropriately. For example, children need to learn the different terms used to express a concept, e.g. subtract, minus, take away. The relevant vocabulary that is expected to be covered by each year group is available to teachers via the National Curriculum. Technical mathematical applications of terms such as 'find the difference', which has a different connotation in everyday use, must also be understood.

Through hearing modelled mathematical explanations and in discussions with teachers and peers, children will become confident at expressing their ideas. Their language skills will help them to assimilate new concepts and engage in mathematical thinking. Children should be encouraged to



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suggest their own problems and to explore solutions. Care is taken to keep written explanations clear and simple.

### **Mental Mathematics**

Good mental methods are based on understanding and a 'sense of number'. Mental mathematics is used from the Early Years upwards to build up speed and confidence in the recall of basic number facts to 20 and to develop mathematical insights. Children are encouraged to work within set time limits. It is essential for children to develop the ability to think about numbers flexibly and to manipulate them confidently. Once children are confident number bonds, multiplication tables are introduced. It is essential for children to obtain a secure and rapid recall of multiplication facts to 12x12. This learning must be based on understanding but a time comes when most children need to make a conscious effort to commit these facts to memory. Our 'Times Table Mountain' helps children to progress through times table recall. Children will be encouraged to learn their tables, beginning with doubling in Year 1. Children are expected to learn all the tables to 12x12 by the time they leave Year 4 (in readiness for the DfE Multiplication tables check), although it is acknowledged that many children will progress more slowly and will still need considerable practice on these in later years. Alongside learning the multiplication tables, children are expected to learn the corresponding division facts and to apply their knowledge to solve problems. The speed at which children are expected to recall their tables will increase as the children become more confident. Children have personal mental maths targets based on their ability. These are practised in school and at home regularly.

### **Problem Solving Activities**

At Rattlesden, we encourage children to see the application of the strategies that they have learnt. When working on problem solving and investigational activities we encourage them to make use of the following general strategies:

- make a graphical/diagrammatic representation
- search for a pattern of results which leads to conjecture
- try and discover whether, and be able to explain why, the conjecture is correct or not
- try setting up another experiment
- looking to see whether a simpler, related problem could be employed
- develop persistence
- record all the possibilities which have been tried
- work with others and communicate progress using words, diagrams and pictures

### **Practical Tasks and Resources**

All children need practical experiences in mathematics that relate to everyday life. It is important for children to experience and explore new concepts practically before moving on to abstract thinking. In order to support this, every class has a wide range of age appropriate physical mathematical resources available, such as Diennes, numicon, tens and ones and pv grids, blocks, Multilink, and 2D and 3D



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shapes. In addition some resources are shared within a Key Stage or are stored centrally for use throughout the school.

### **Pupils' Records of Their Work**

Pupils at Rattlesden Primary School record their work to:

- clarify their own thinking
- act as an aide-memoire for future reference
- communicate to others
- provide evidence of their learning in mathematics

Recording will take many different forms, depending on the nature of the mathematical activity and the purpose of the record. For example it may be numerical, graphical or written.

### **Cross-Curricular Links**

Although the National Curriculum separates subjects neatly into their own categories, at Rattlesden we are very aware of the cross-curricular links between maths and the other subjects that we teach. Mathematical opportunities are identified at the planning stage of a topic. A few examples of this are given below.

**Literacy:** The language of maths, e.g. difference. Word problems and the vocabulary used. Number rhymes. Number stories e.g. The Three Little Pigs.

**Science:** Recording measurements of time, weight, capacity, temperature and height in observations and experiments. Prediction. Use of data handling. Frequency tables, fractions, decimals, percentages, ratio, scale, averages, angles.

**Computing and ICT:** Maths programs and websites available. Data logging using iPads. Researching a presenting information. Use of spreadsheets to aid data handling. Use of programmable robots.

**History:** Timelines. Maths of the period being studied e.g. how time was measured in Ancient Greece, the development of number systems, rotational symmetry in art E.g The Tudor Rose.

**Music:** Counting rhythm and patterns. Music notation and equivalent lengths of notes.



P.E.: Time and distance. Calculating speed. Using a stopwatch. Calculating Netball and Football scores. Positions. Ordinal numbers. Calculating pulse rate (Bpm)

Geography: Using co-ordinates to find places on maps. Calculating distance by using scales on maps. Compass points. Clockwise and anti-clockwise turns. Data handling e.g. climate charts.

Art: Symmetry. Tessellation. Angles. Perspective. Repeating Patterns. Ratio. Shape.

D.T.: Designing games. Measuring angles, length, capacity and weight. Symmetry of design. Prices of ingredients for food technology. Ratio of ingredients. Nets of 3D shapes.

R.E.: Religious symbols, e.g. drawing a Star of David. Symmetry in religious buildings. Rotational symmetry in Rangoli patterns. Islamic patterns.

Outdoor Learning: use of concrete materials for counting and sorting, making natural algebraic equations, comparing and measuring length of grasses, creating nets of 3D shapes, reinforcing data and statistics by creating large scale bar charts, Carroll and Venn diagrams with chalk.

### **Contribution to Spiritual, Moral, Social and Cultural Needs**

As stated previously, mathematics is a skill that is necessary for adult life. Increasingly, basic numeracy and confidence with handling data are key requirements for many jobs. In addition, mathematical skills are necessary to evaluate the value of discounted goods, interest rates and other financial activities. Reports in the media often include tables of statistics, or ratios and percentages. To make wise decisions as teenagers and adults, our children need to be equipped with a full range of mathematical evaluative skills.

There are also opportunities to celebrate the achievements of other cultures, including Arabic, Indian, and Chinese contributions to the development of aspects of maths that can be accessed by all children. Corridor displays and special occasions such as Maths Day provide the chance for children to begin to discover that maths is a truly universal language. While at Rattlesden, we also hope to enrich children's lives by helping them to develop an appreciation of the beauty and creative aspects of mathematics.



### **Assessment, Record Keeping and Reporting Assessment for Learning**

Assessment for Learning is an ongoing process which is part of every teacher's repertoire. Children's work is constantly assessed to inform teachers' planning of subsequent lessons, and appropriate records are kept. Assessment takes place when teachers talk with the children, mark their work, or set tests, problems or investigations. Pupil progress meetings are held each term between class teachers and the head teacher to discuss pupils' progress and attainment.

### **Summative Tests**

Alongside their ongoing assessment, teachers use Rising Stars PUMA tests to inform their judgement about a child's current level of attainment in maths. These results are then uploaded to Insight Tracking to show a picture of pupil progress and attainment over time. The Assessment Coordinator then analyses the data, and discusses any patterns, gaps and possible interventions/approaches with the head teacher and Maths coordinator at termly meetings. The assessment coordinator then shares this data with the governing bodies of the school and trust.

### **Marking and Feedback**

All teachers will give pupils regular, positive feedback. When marking work, encouragement and support is given to each child in addition to clear guidance on how to improve. Efforts are made to give children feedback during the lesson using 'live marking' or as soon as possible afterwards. Positive feedback may be followed with a target for improvement or a next step to deepen the learning. These comments and targets can be given verbally and in writing.

In Reception and KS1 the children do much of their number work in practical activities. Practice is needed in number formation and this is carefully taught. Recording may be informal on mini-whiteboards; in maths books or on work sheets. Work is marked with the child present wherever possible as verbal feedback is very important. Correct answers are ticked. Incorrect answers may be marked with a dot or the teacher may draw a line under one for which the child can write the correction. If a number is formed incorrectly the teacher may write it correctly.

In Key Stage 2 children:

- show the stages of their thinking, particularly with multi-step problems'
- complete corrections when required,
- sometimes mark their own work, or that of a partner.

Our positive marking policy includes giving written and verbal praise, stickers, stamps and house points. Teachers may add their own individual incentives if they wish. Good work and effort in mathematics can also be celebrated in our weekly celebration assembly. Mathematics work is also displayed in the classrooms and corridors.



### **Reporting to Parents**

In the autumn and spring term parent consultations, parents and carers are informed of their child's mathematical progress, including the key areas to be worked on for the future. Parents are also provided with written 'Interim Reports' for their reference. In the summer term, we send home detailed reports outlining the children's achievement across the curriculum. These include written comments and targets for maths and inform the parents of their child's attainment in relation to the National Curriculum age expectations. In Years 2 and 6, these reports include the child's results in National Curriculum test/task scores, alongside our own teacher assessments.

### **Inclusion and Equal Opportunities**

At Rattlesden Primary School, we believe that every child, irrespective of gender, race or ability should have access to a broad and challenging maths curriculum. Monitoring of annual test results takes place each year to compare performance by specific groups, such as boys, girls, children on the SEN register, and those who receive free school meals. We endeavour to adapt our teaching if the findings point to any changes that should take place.

### **Health and Safety**

There are usually no health and safety issues specific to maths teaching and learning at Rattlesden School. Teachers are expected to adhere to the school Health and Safety Policy at all times, and to consider occasional potential hazards such as kilogram weights when using scales, sharp points when using compasses, etc. and to take appropriate precautions.

### **Monitoring and Review**

The teaching and learning of maths at Rattlesden Primary School is overseen by the subject coordinator and the head teacher (under the direction of the Thedwastre Education Trust). These include responsibility for developing the curriculum, supporting other staff, and prioritising the purchasing of resources from the available budget. The subject coordinator and other members of staff will attend courses run locally as needed for continuing professional development. Senior management meetings and staff meetings will take place to discuss the on-going development of maths and our commitment to refining and improving the quality of our maths teaching and the standards achieved by the children. These formal settings are in addition to informal support, advice and feedback opportunities throughout the school year.

### **COVID 19 Recovery Plan- Summer and Autumn 2021**

Class teachers used the NCETM evaluation and prioritisation planning documents to assess pupils' learning against the DfE's 'ready to progress criteria'. Planning for the Summer Term was then adjusted accordingly. These documents will also be used to aid transition at the end of the school year to provide teaching staff with detailed information on any gaps between pupil attainment and age expectations.

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This policy will be regularly reviewed, and updated when there are substantial alterations to government policy and guidance, or when practice within school is changed.

We will continue to evaluate our practice in mathematics teaching and learning, and to improve it in order to prepare Rattlesden children for end of key stage tests, for progression to secondary education, and for the application and enjoyment of mathematics throughout their adult life.

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