



# Mathematics Policy

*'Where children come first'*

## **Introduction**

*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. (National Curriculum 2014)*

Maths is everywhere and yet, children may not recognize that because it doesn't always look like the Maths they do in school. It seems that maths in the world around us sometimes may be invisible. However, maths is present in our world all the time--in the workplace, in our homes, and in life in general. When you buy a car, follow a recipe, or decorate your home, you're using math principles. People have been using these same principles for thousands of years, across countries and continents. Whether you're sailing a boat off the coast of Japan or building a house in Peru, you're using maths to get things done.

In a recent discussion a group of us were challenged to name a job where you did not use maths, we couldn't think of one. Nowadays employers say there is a greater need for math skills than ever before.

Mathematics is important in everyday life. It is integral to all aspects of life and with this in mind we endeavour to ensure that children develop a healthy and enthusiastic attitude towards mathematics that will stay with them.

Mathematics teaches children how to make sense of the world around them through developing their ability to calculate, reason and solve problems. It enables children to understand relationships and patterns in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

## Aims

At Seven Stars, we aim to:

- Promote a positive attitude towards maths and enjoyment of learning through practical activity, exploration and discussion.
- Develop mathematical skills and knowledge and a quick recall of basic facts.
- Develop an ability to solve problems, to reason, to think logically and to work systematically and accurately.
- Develop an ability to communicate mathematics and express ideas concisely using accurate mathematical language.
- Help children understand the importance of mathematics in everyday life.
- Develop initiative and an ability to work both independently and in cooperation with others.
- Develop an ability to use and apply mathematics across the curriculum and an awareness of the uses and applications of mathematics in everyday situations.
- Promote understanding of mathematics through a process of enquiry and experiment.

## Aims of the National Curriculum

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.

## Knowledge Rich Curriculum

We agree with the [Ofsted research review series: mathematics](#) that maths addresses 3 key categories of knowledge:

- i. Declarative (facts and formulae)
- ii. Procedural (methods / procedures / mechanisms)
- iii. Conditional (strategies / relationships / reasoning)

And our Maths curriculum should and does reflect a focus on those areas of knowledge.

## **INTENT**

Maths is a crucial part of our 'Open Doors' Whole School Curriculum Intent

*To 'open doors' for all our pupils to develop an appreciation of and proficiency in Maths (improving outcomes for all):*

### **Door 1 (Key Skills)**

- ✓ Develop reading / question comprehension skills to understand Maths word problems
- ✓ To develop proficiency in all aspects of Maths in order to engage with Maths in everyday life

### **Door 2 (The World)**

- ✓ Identifying ways in which Mathematics is used around the world (e.g. in architecture, economics, commerce, trade, work, data & science)
- ✓ Identify key figures in Mathematical history and cultural contributions to Maths (e.g. Archimedes, Katherine Johnson; forms of counting)

### **Door 3 (Healthy lives)**

- ✓ Use of Maths in healthy living (data, medical/health/fitness statistics)
- ✓ Building Maths confidence and financial confidence (use of Maths in budgeting)

### **Door 4 (Creativity)**

- ✓ Identifying Maths in creative arts e.g. pattern in art and music, and in design (e.g. architecture)
  - ✓ Develop creative problem-solving

### **Door 5 (Communication)**

- ✓ Developing Mathematical vocabulary
- ✓ Use of statistics and data when presenting arguments and attempting to persuade

**This intent will be achieved through ensuring that:**

1. All staff are confident in their subject knowledge and able to plan, deliver and review Maths sessions (whole class and group) effectively addressing gaps in understanding (and staff are implementing the school calculation policies)
2. Children are growing in Maths confidence through improved proficiency (quick recall of number facts and mathematical concepts) and applying their understanding in cross-curricular and real-life contexts.
3. Parents/guardians are engaged in supporting their child's mathematical development.

### **Mathematics curriculum planning and organisation**

The 2014 National Curriculum for mathematics describes what must be taught in each key stage. The mathematics taught at Seven Stars follows these statutory requirements. The methods used reflect the recommendations outlined in the accompanying notes and guidance. Teaching is based on the plans devised by Lancashire's Learning Excellence Mathematics Team. However, it is often necessary to adapt these plans to meet the varying needs, interests and abilities of all our children. Mathematics in the Early Years is in accordance with the Early Years Framework.

Each class teacher is responsible for the planning and teaching of mathematics in their class. The approach to the teaching of mathematics within the school is based on the following:

- A clear learning objective and success criteria, if appropriate, for the lesson which are shared with the children.
- An emphasis on mental calculation.
- Two additional half hour mental maths sessions per week, on English days.

Teachers of the EYFS ensure the children learn through a mixture of adult led activities and child initiated activities both inside and outside of the classroom.

## **Knowledge Rich Curriculum**

We agree with the [Ofsted research review series: mathematics](#) that Mathematics addresses 3 key categories of knowledge:

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And our Maths curriculum should and does reflect a focus on those areas of knowledge.

## **Curriculum Organisation**

All year groups use the Lancashire Mathematics Planning CD. This ensures that content is coherent, progressive and carefully sequenced. Every teacher ensures that links are made between topics and across subjects to ensure that mathematics has a purpose and is weaved between everything that we do in school.

The Lancashire Planning CD is based on revisiting learning regularly and using knowledge and skills across the curriculum to help embed learning in children's memory. KS1 and KS2 curriculum satisfies the requirements within the National Curriculum - content and order in terms of year group expectations. Year group expectations are broken down into smaller manageable steps around which to build individual lessons.

## **EYFS Curriculum**

The mathematics curriculum in Reception (EYFS) is split into two categories; number, plus shape, space and measure. Maths is taught in a purposeful, practical way and children use play and exploration to acquire mathematical skills. A large majority of mathematical work is practical and learning occurs in many different contexts around the classroom and outside. In the EYFS, Development Matters is followed alongside the Lancashire LAPS. The Lancashire Planning CD for mathematics in the EYFS has been replaced with 'Sequence of Learning' which will be used in EYFS.

## Key Stage 1 - Years 1 and 2

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.

At Seven Stars School, pupils in year 1 and year 2 now follow 'Red Rose Mastery'. This is a scheme written by Lancashire which leads the pupils through lessons but also makes them think carefully and deeply about what they are doing using the skills of representation & structure, coherence, mathematical thinking, variation and fluency. This scheme will eventually be followed by all year groups over the next few years.

## Lower Key Stage 2 - Years 3 and 4

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.

At Seven Stars School, pupils in year 3 and year 4 also follow 'Red Rose Mastery'. As stated above, this is a scheme written by Lancashire which leads the pupils through lessons but also makes them think carefully and deeply about what they are doing using the skills of representation & structure, coherence, mathematical thinking, variation and fluency. This scheme will eventually be followed by all other year groups over the next few years.

## Upper Key Stage 2 - Years 5 and 6

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.

### **Curriculum Adaptation and Differentiation**

Adjustments are made to ensure equal access of the curriculum is offered to all children. This could mean that resources are used to support or extend, questioning is adapted, activities are changed to ensure that all pupils needs are accounted for whether that be the more able or those with special educational needs.



Enrichment opportunities within the curriculum are provided to ensure that mathematics is seen across the curriculum. For example, charts and graphs in science, table in geography, shape in art. Theme days and weeks take place to ensure that pupils develop a love of mathematics as well as seeing mathematics in a range of real-life contexts.

Pupils with special educational needs are encouraged to use a variety of resources to support and extend their learning such as Base 10, bead strings, straws, counters, place value grids and charts and many more materials. Human resources are also used to guide them through their learning be it through guided teaching, support in lessons or following lessons in the form of intervention. A variety of strategies are implemented to cater for different teaching and learning styles such as visual aids, practical learning opportunities including the use of the outdoors, tactile resources and different ways of presenting information and tasks. Some pupils may benefit from a multi-sensory approach and use a variety of resources accompanied by a range of teaching and learning approaches.

## IMPLEMENTATION

A variety of approaches to learning are used at our school - we use practical, visual, kinaesthetic and auditory methods to ensure that every type of learning style is provided for.

### Planning

The planning of the curriculum is organised in three phases:

- **long term planning** which shows the organisation of the mathematics topics across the year for each year group, and the coverage and progression of knowledge, skills and understanding;
- **medium term planning** which demonstrates the progression of knowledge, skills and understanding within each topic;
- **short term planning** which explains how children will build on their existing understanding with the new learning specified as focused learning objectives for each given lesson.

### Professional Development of Staff and Use of Resources

Seven Stars Primary School promotes a firm commitment to continuous professional development for all teaching and support staff and ensures staff are supported to provide the best quality teaching possible. Each year, the school improvement plan makes explicit the priorities to be addressed, clear objectives for improvement, timescales and measurable evidence of success and the

subsequent impact. High quality training takes place to ensure that school staff, both teachers and teaching assistants, have the necessary skills and expertise to deliver the curriculum correctly, building on prior learning and providing well sequenced lessons. The subject leader keeps up to date with new developments and initiatives within mathematics and shares updates with school staff and governors. Resources are audited regularly and stored centrally so they can be accessed by all staff. A wide variety of day to day resources are also stored in classrooms so they be accessed easily during lessons to support daily teaching and learning.

### **Use of intervention**

Intervention is used on a daily basis to address misconceptions promptly before the next lesson. Pupils are taken aside before the next lesson and are shown how to correct their work, ensuring full understanding before progressing to the next stage. They make their corrections in purple pen to highlight areas that have now been addressed.

### **Use of further challenge (deeper learning)**

Pupils working above age-related expectations will be provided with higher-level work and opportunities for challenge to extend their learning. All pupils will be challenged so that they not only meet age-related expectations, they are encouraged to work at a higher level and to grapple with complex challenge appropriate to their ability. Next steps marking is used when appropriate to challenge and extend thinking further.

### **Development of subject specific vocabulary**

All pupils will be exposed to and encouraged to use technical mathematical vocabulary suitable to the unit of work they are studying. This may be thorough teacher modelling, reference to working walls, language used within activities and games to be completed or in oral and written feedback.

### **Parental Involvement**

At Seven Stars Primary School, parents and carers are held in high regard. They are seen as partners in their child's learning so are encouraged to get actively involved with mathematics through:

- supporting homework;
- using the calculations policies published on the school website to understand how maths is taught in a progressive, well-sequenced way;
- attending parental workshops led by school staff;
- discussing their child's progress in maths at parent's evenings;

Parents and governors are also encouraged to attend maths themed enrichment events such as theme weeks.

### **Monitoring of the Implementation**

All aspects of mathematics are monitored by the subject leader. This may sometimes be alongside the headteacher or other members of staff. The mathematics governor is involved in the monitoring of teaching and learning in maths and is regularly invited to observe the subject leader monitoring mathematics. A report back to the governing body is then prepared and shared at governor meetings. Mathematics is monitored through regular and rigorous book scrutinies, planning scrutinies, learning walks, lesson observations, subject leader interviews and pupil interviews.

## **IMPACT**

### **Relevance of learning**

Teachers ensure that all learning in mathematics is relevant and linked to real life situations. Links between themes, topics and units in mathematics are also made explicit so that pupils understand what they are learning and why.

### **Enjoyment of learning**

At Seven Stars School, enjoyment of learning is crucial and central to our belief of what makes outstanding provision for our pupils. If pupils enjoy learning they are more likely to remember what they have learnt - this ensures 'sticky knowledge'.

### Progression in knowledge, skills, understanding and ability to apply this

All lessons are well sequenced and progressive so that pupils' knowledge and understanding of the topic they are studying is enhanced and embedded. Pupils are then able to apply their knowledge and understanding to other areas of maths and indeed, across the curriculum. They do this by developing conceptual understanding, fluency, reasoning and problem-solving. Efficiency in mathematics is always encouraged and modelled by teachers - this can be achieved by using mental methods in the first instance and a formal method if appropriate.

### Independence

All pupils at Seven Stars Primary School are taught to become more independent in their thinking so that they 'grapple' with content and develop resilience with regards to mathematics. They try different approaches when solving problems and reasoning to ensure they reach the end goal which is to find the answer or solution.

### Use of feedback to improve learning

Oral and written feedback is used both in the lesson and following the lesson to guide pupils with mathematics learning. This must be structured so that pupils are encouraged to work out the correct answer rather than just being told the correct answer. When feedback is effective, children will learn.

### Outcomes: understanding, engagement, attitude to learning, attendance, data

At Seven Stars Primary School, we aim to ensure that all pupils reach their full potential as a minimum and outcomes show this. A high-quality mathematics education 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.

By the time pupils leave Seven Stars School, as a result of the maths curriculum taught, the vast majority of pupils will be able to reason mathematically about all topics taught, solve arithmetic questions with accuracy and understanding, show that they understand all concepts even when presented in different ways and apply their thinking to a wide variety of problems in all curriculum areas. Pupils will also be able to explain their reasoning succinctly and using appropriate mathematical knowledge and understanding. They will use the most efficient methods and calculate effectively in a range of contexts. Pupils will build on prior knowledge and understanding and will be able to make links between topics and other curriculum areas. They will be able to correct themselves and others by checking their answers and explaining where and how they went wrong.

### Assessment: summative and formative including standards and moderation

Assessment is fundamental to the process of teaching and learning and forms an important part in the lives of pupils and teachers. It's therefore vitally important that we understand how assessment works and how to get it right. The way assessment is organised in a classroom plays a key role in creating the culture, attitudes and norms of behaviour and enables teachers to shape the positive conditions in which pupils' learning can flourish. At Seven Stars Primary School, summative and formative assessment is used and termly in school and school to school moderations take place.

## Formative Assessment

Use of formative assessment whereby new learning builds on children's existing knowledge and understanding is used daily. Decisions about what children need next (support, extension, next step) are made and applied.

## Summative Assessment

Termly tests are used to inform teachers when assessing termly pupil progress meetings and end of year data drops. They are also used to inform teachers about gaps in learning to inform the planning of the next sequence of lessons. Termly tests are used by all year groups from Year 1 to Year 6.

Statutory end of key stage assessments are completed in the EYFS and Y6. This process includes formal tests in arithmetic and mathematical reasoning. These results are submitted to the DfE and local educational authority so that the performance of the school can be analysed and compared with other schools.

## Reference to other policies that are relevant

Mathematics is not a stand-alone subject and links to many other curriculum areas such as geography, history, science, art and computing for example. In addition, links to the SEN policy make provision explicit for those children who require additional support in mathematics.

## Contribution of mathematics to teaching in other curriculum areas

Through a creative curriculum approach and through our 'Open Doors' whole school curriculum, teachers seek to explore and utilise further opportunities to use and apply mathematics across all subject areas.

## Science

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, pupils 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.

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### **Art, Design and Technology**

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**

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 time line, similar to the number line that they already know.

### **Physical Education and Music**

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.

### **Personal, Social and Health Education (PSHE)**

Mathematics contributes to the teaching of personal, social and health education. The work that children do outside their normal lessons encourages independent study and helps them to become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views. We present older children with real-life situations in their mathematics work on the spending of money.

### **English**

The teaching of Mathematics contributes significantly to children's understanding of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, in mathematics lessons we expect children to read and interpret problems, in order to identify the mathematics involved. They are also improving their command of English when they explain and present their work to others during plenary sessions. In English lessons, too, maths can contribute: younger children enjoy stories and rhyme that rely on counting and sequencing, while older children encounter mathematical vocabulary, graphs and charts when reading non-fiction texts.

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### **Spiritual, moral, social and cultural development**

The teaching of mathematics supports the social development of our children through the way we expect them to work with each other in lessons. We group children so that they work together, and we give them the chance to discuss their ideas and results.

### **Computing**

Computing technology enhances the teaching of mathematics significantly, because technology is particularly useful for mathematical tasks. It also offers ways of impacting on learning which are not possible with conventional methods. Teachers can use software to present information visually, dynamically and interactively, so that children understand concepts more quickly. Younger children use technology to communicate results with appropriate mathematical symbols. Older children use it to produce graphs and tables when explaining their results, or when creating repeating patterns, such as tessellations. When working on control, children can use both standard and non-standard measures for distance and angle. They can also use simulations to identify patterns and relationships.

### **Mathematics, Inclusion and Equal Opportunities**

The mathematics lessons are inclusive to pupils with special educational needs, those with disabilities, those with special gifts and talents and those learning English as an additional language, and we take all reasonable steps to achieve this. Where required, children's SEN support plans, group intervention plans or EHC incorporate suitable objectives from the New National Curriculum for Mathematics or Development Matters and teachers keep these objectives in mind when planning work. These targets may be worked upon within the lesson as well as outside the Mathematics lesson. Maths focused intervention programmes are available in school to help children with gaps in their learning and mathematical understanding. These are usually delivered by trained support staff and overseen by the class teacher. Within the mathematics lesson teachers must not only provide differentiated activities to support children with special educational needs but also activities that provide appropriate challenges, to develop depth of learning and mastery, for children who are high achievers in mathematics. It is vital that all children are challenged at a level appropriate to their ability. We ensure that all children are able to fulfil their potential regardless of race, religion, disability or gender.

Teacher assessments look at a range of factors - classroom organisation, teaching materials, teaching style and differentiation so that we can take some additional or different action to enable the child to learn more effectively. Assessment against the National Curriculum allows us to consider each child's attainment and progress against expected levels. This ensures that our teaching is matched to the child's needs.

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**Signed:** *John Buchanan*

**Date:** October 2021

**Date to be reviewed:** October 2022 (or in light of new developments and progress)

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