

# St John Vianney Catholic Primary School, West Denton



*Through following Jesus, we aim to be a caring, happy school, where everyone is valued and appreciated and can reach their true potential. We hope to act justly, love tenderly, and walk humbly with our God*

## Mathematics Policy 2023-2025

Date reviewed: November 2023

Date of next review: November 2025



## Our whole school curriculum vision

### Vision

At St John Vianney Catholic Primary School, we endeavor to provide a broad and balanced curriculum which inspires and provides opportunities for success for all of our learners. Through our curriculum, we strive to create independent, curious, creative and critical thinkers, problem solvers and innovators. We aim to provide engaging learning opportunities that encourage our pupils to develop and fulfil their potential academically, socially, emotionally and spiritually. We strive to provide a range of activities and opportunities through a carefully sequenced and progressive curriculum in all subject disciplines, which fosters a passion for learning, stretching beyond the confines of primary school and creates lifelong learners. Our vision is that our curriculum will ignite passion, expand horizons and raise aspirations for all of our learners. We aim to equip our pupils with the knowledge and skills that will prepare them for the world of work in an ever-evolving landscape, and with the confidence, resilience and tolerance to live harmoniously with others.

### Curriculum Intent

Through our curriculum we aim to:

- be inclusive to all learners and provide opportunities for all learners to succeed, regardless of their individual starting points;
- foster a lifelong love of learning;
- develop a rich subject knowledge, including substantive and disciplinary knowledge, conceptual and procedural knowledge;
- make meaningful links between topics within a subject, between different disciplines and across year groups;
- make links to the world in which we live, which goes beyond the white western experience, thereby instilling a positive attitude of respect and tolerance of other societies, cultures and religions;
- raise the self-esteem of children as capable and resourceful learners;
- develop children's ability to think creatively, solve problems and innovate;
- develop children's capacity and confidence working independently and collaboratively;
- to understand the purpose and value of their learning and how their skills will develop and progress over time.

We believe that all learners should experience success across the curriculum and be allowed to develop their own interests and passions within the curriculum. Therefore, our curriculum is delivered with the understanding that all of God's children are blessed with different talents and skills, and the knowledge that there is 'something for everyone' within both core and foundation subjects. For this reason, we ensure that the same value and high standards of learning and teaching are upheld in all subjects across the curriculum. In ensuring success for all children across the curriculum, we aim that this will create confident, resilient and impassioned children who have high self-esteem as learners.

Alongside academic success, the emotional, spiritual and physical wellbeing of children is of high priority, and as such, regular and meaningful opportunities for personal development are integrated throughout the curriculum. We believe that it is our duty to educate and develop the whole child. Our PSHE and RSE curriculum has been refined to ensure that pupils build positive relationships with others, feel valued and those who are most vulnerable are identified and supported. Our curriculum has the flexibility to respond to the needs and priorities of our children and of the local area.

It is our aim that all children develop a knowledge and understanding of and take pride in the British Values of our rich and diverse society and its history. Throughout the curriculum, we present children with the experiences of a diverse range of people, through texts, key figures in different disciplines and exploring the history through a lens that is not always that of the white western experience.

We believe that successful learners are aware of the key skills and strategies of that help them to 'know more and remember more' and make progress. We developed a toolkit of fundamental characteristics of effective learning – LEARNER. These principles are explored with children and modelled within lessons by teachers, creating an ethos of 'lifelong learning' within St John Vianney Catholic Primary School.

At St John Vianney Catholic Primary School we aim for all pupils to receive a broad experience in Mathematics.

### **Intent of the Mathematics Curriculum**

A high-quality maths education aims to provide pupils with opportunities to make sense of the world around us. Through developing a child's ability to calculate, reason and to solve problems, they are empowered to understand and appreciate relationships and pattern, in both number and space in their everyday lives; therefore, all staff endeavour to encourage children to foster a love of mathematics. Through their growing knowledge and developing understanding, children learn to appreciate the beauty, power and creativity of mathematics. We aim to develop in children a curiosity about the discipline.

As outlined in the National Curriculum (2014), our principal aims in Mathematics are to ensure that all pupils:

- Are engaged and motivated to deepen their knowledge in specific areas linked to the National Curriculum.
- Develop cross curricular links and strengthen further links with the local and wider community and global world.
- Deepen children's knowledge and understanding by planning extracurricular visits where possible.
- Become fluent in the fundamentals of mathematics, 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.
- To foster a positive attitude to mathematics as an interesting part of the curriculum.
- To develop the ability to think clearly and logically, with confidence and increasing efficiency.
- To develop the ability to apply knowledge, skills and ideas in real life contexts outside the classroom and become aware of the uses of mathematics in the wider world.
- To develop the ability to use mathematics as a means of communicating ideas.
- To build personal qualities such as perseverance, independent thinking, cooperation and self-confidence through a sense of personal achievement and celebrated successes.

### Implementation

Through use of the National Curriculum (2014), paired with the structured mastery approach of Maths No Problem, all teachers endeavour to:

- Deliver a varied and engaging long term plan that is ambitious and ensures the lessons are linked to the National Curriculum but are also linked to the interests of the children in school where possible.
- Deliver daily maths lessons that incorporate high quality whole class and group teaching. During these lessons we encourage children to ask as well as answer mathematical questions. Within which, through use of maths toolkits, children have the choice and opportunity to use a range of resources to support their own mathematical development.
- Use ICT in mathematics lessons where it will enhance their learning, as in modelling ideas and methods. The children are given the opportunity to engage in a wide variety of problem solving and reasoning activities within each lesson, where possible and appropriate.
- Encourage the children to use and apply their learning in everyday situations. Arithmetic thinking is at the core of what we teach and all pupils are encouraged to develop the computational links between different aspects of their mathematical learning.
- Use a Spiral Curriculum; at St John Vianney, we believe that education should facilitate children to know more and remember more. With this principle in mind, we have adopted a curriculum that is spiral in nature. The spiral curriculum is defined as a curriculum that returns to the same topics over time, in this case within an academic year. As children return to an area of study, teachers activate their prior knowledge and build on these foundations to revisit the topic in more depth. This approach to mathematical learning is underpinned by Jerome Bruner's pedagogy and research (1960).
- Support the retention of children's prior learning through use of weekly retrieval practise using Tough Ten 'Maths Blast' activities; one per week through each key

stage as well as two per week in Year 6; these activities allow children to revisit learning from their last mathematics lesson, last week's mathematics learning, last topic's mathematical learning and last year's mathematical learning.

### Fluency

Mathematical fluency is the ability to quickly and accurately recall mathematical facts and concepts. Fluency is not limited to number and calculation, but is needed across the primary curriculum.

The use of concrete, manipulative resources and visual, pictorial representations is essential in ensuring conceptual fluency in children. It is only then that children are ready to move onto abstract notations and strategies, thereby ensuring procedural fluency. Moreover, it is not enough to present fluency questions in the same way repeatedly: children need to apply their knowledge and skills to a range of varied fluency question types. Fluency forms a key element of our daily mathematics lessons at St John Vianney, ensuring that children are procedurally and conceptually secure before moving onto reasoning and problem solving. All children from Year 2 to Year 6 practise their arithmetic skills weekly in an arithmetic test. Teachers then unpick misconceptions and reinforce the accurate methods and strategies in this weekly session. As such, this provides another opportunity to activate prior learning and promote procedural and conceptual fluency.

We also prioritise mathematics at St John Vianney, as we recognise that short daily sessions of maths, over time, accumulate into a significant amount of time weekly, termly and yearly. From Year 2 - Year 6, children take part in 'Tough Ten' mathematics activities – ten arithmetic questions completed at the start of each school day. This task may be recorded on whiteboards or completed as a whole class in KS1, and then in arithmetic books in KS2.

At St John Vianney, we know that multiplication facts and derived division facts (known as times tables) are crucial to children's understanding of more complex areas of mathematics. The KS2 Multiplication Tables Check is now a statutory assessment for children in Year 4. All children are provided with a log in to 'Times Tables Rockstars', where they practice times table facts at their level in an engaging and fun way. As part of their homework, children are encouraged to spend time on the website daily.

### Reasoning

Reasoning in maths is the process of applying logical and critical thinking to a mathematical problem in order to work out the correct strategy to use (and just as importantly, not to use) in reaching a solution. Reasoning can be seen as a crucial linking bridge between a child's fluency in mathematics and their ability to problem solve. It provides children with an unfamiliar context within which to use their mathematical skills. Reasoning forms a key part of national assessments at the end of KS1 and KS2 (SATS). Children are supported by concrete and pictorial representations when reasoning, in every year group. Reasoning in mathematics at St John Vianney is also underpinned by mathematical talk and listening, as outlined below. Children are challenged in lessons to explain their thinking, whether that is with concrete resources, visual representations, calculations or mathematical talk.

We ensure all children are exposed to mathematical reasoning activities at their level, in all lessons. In KS1, this may be completed orally, on whiteboards, in groups or as a whole class. In KS2, children are encouraged to work collaboratively in all lessons to answer reasoning problems that stretch and challenge, this is posed initially as an explore segment within their lesson. Children are supported by reasoning sentence stems which allow them to express themselves mathematically when reasoning. Stems are displayed in all classrooms as well as within lesson prepared PowerPoints. These sentence stems are different for KS1 and KS2.

### Problem Solving

Problem solving can be viewed as the end goal towards which we teach mathematics. Armed with procedural and conceptual fluency, and an ability to reason about maths, children are able to tackle unfamiliar problems. There are various types of mathematical problems which we aim to expose children to, including: word problems, logic problems, finding all possibilities, visual problems and rules and patterns problems. When problem solving, we encourage children to follow four key steps:

1. Read and think - Look at the problem you are trying to solve. Read it more than once. What information do you have? Underline it! What information are you missing? Note that down too! What are you trying to work out? See if your partner agrees.

2. Pictures/representations - How can you visualise your problem using a picture, a diagram or using Maths equipment? You could use: a bar model, a part-part-whole model, a number line, cubes, counters or Numicon. Draw or show your thinking using the method of your choice.

3. Operations - Which operations will you use to solve the problem? Addition? Subtraction? Multiplication? Division? Use your chosen strategy to work out your answer. How does it look? Read the question again. Is it a sensible answer? 4. Check and Explain - Check your answer. Work out the answer again to be sure your answer is correct. Can you use the inverse operation to check your answer is correct? Now explain your strategy: why did you choose to work it out this way? Prove that your answer is correct. Could you have used a different method to find your answer? These steps are displayed in all classrooms from Year 2 to Year 6 to support children's problem-solving skills.

3. Concrete, Pictorial, Abstract. In mathematics can sometimes be regarded as inaccessible as it is very abstract in nature. First developed by Jerome Bruner, the CPA approach (concrete, pictorial, abstract) moves learners through mathematical concepts by first meeting concrete resources, then visual representations before finally, abstract methods. At St John Vianney, we believe that all learners, of all ages and abilities, should experience all steps of the CPA approach. - 6 - The concrete step is the "doing" stage. It allows students to use concrete resources to model and solve problems. It is this step that often brings mathematical concepts to life for children. The pictorial step is the "seeing" stage. Visual representations are used to model problems. It provides a crucial link between the physical experiences of the concrete step and the abstract process. It helps visualise abstract concepts and as such, aids children's understanding. The abstract step is the "symbolic" stage. Children are ready to access this

stage of learning once they have grasped concepts in the concrete and pictorial stages. This stage uses only abstract notations and symbols.

### Maths Talk

At St John Vianney, we recognise how important mathematical talk is in ensuring children's understanding. Mathematical talk can be heard in all lessons, in a variety of ways: teachers set high expectations for mathematical talk and vocabulary in whole class teaching; the frequent use of talk partners to allow children to unpick their thinking at key moments in lessons; when reasoning about mathematics; when solving problems in pairs or groups; when explaining how children came to an answer. Teachers use open-ended, targeted questioning in lessons to extend children's understanding, support and consolidate learning and as formative assessment for learning. In order to close the vocabulary gap in mathematics, teachers expose children to key vocabulary as they meet it, to ensure all children can access the lesson. Children are supported by reasoning sentence stems which allow them to express themselves mathematically when reasoning. Stems are displayed in all classrooms, and kept in children's books so as to be readily available. These sentence stems are different for KS1 and KS2.

### Adaptive Teaching (Bespoke differentiation)

As a school, we recognise that children come to school and into each class with different starting points. St. John Vianney school facilitates mixed ability teaching through a range of strategies including:

- using differentiated group work
- setting tasks of increasing difficulty
- organising the children to work in pairs on open-ended problems or games
- providing resources of different complexity according to the ability of the child
- using classroom assistants to support the work of individual children or groups of children

### Early Years

We teach mathematics in Nursery and Reception classes. As the Nursery and Reception classes are part of the Early Years Foundation Stage of the National curriculum, we relate the mathematical aspects of the children's work to the objectives set out in the Birth to 5 Matters 'Problem, Solving Reasoning and Numeracy'. We give all the children ample opportunity to develop their understanding of number, measurement, pattern, shape and space through varied activities that allow them to enjoy, explore, practise and talk confidently about mathematics. We do this through use of the National Centre of Excellence for Mathematics Mastering Number programme.

[\(https://www.ncetm.org.uk/maths-hubs-projects/mastering-number-at-reception-and-ks1/\)](https://www.ncetm.org.uk/maths-hubs-projects/mastering-number-at-reception-and-ks1/)

The contribution of mathematics to the broad and balanced wider curriculum

### **English**

Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, we encourage children to read and interpret problems in order to identify the mathematics involved. The children explain and present their work to others. Children enjoy stories and rhyme that rely on counting and sequencing, they encounter mathematical vocabulary, graphs and charts when using nonfiction texts and are supported when using sentence starter prompts to explain the reasoning strategies they have used when problem solving.

### **Science**

Science is integral to our pupils' ability to demonstrate their knowledge and understanding of maths in the real world. It actively promotes the skills of reasoning and problem solving, including the understanding of data within scientific investigations.

### **History**

Understanding of the chronology of events is crucial in the teaching of History, both within and era as well as in understanding where a period of history fits within a wider timeline. History lessons involve the sequencing of events.

### **Geography**

Map work, including with coordinate grids and ordnance survey maps, involves the use of various maths skills, including using coordinates and recognising symbols. Atlases used in Geography lessons include scaled representations of geographical areas, which allows children to explore scaling and ratio. Geography lessons allow children to explore the points of a compass and position and direction.

### **Computing**

Children use and apply mathematics in a variety of ways when solving problems using ICT. Pupils are able to use software to communicate results and produce graphs/tables when explaining their results or when creating repeating patterns, such as tessellations. When working on control, children use standard and nonstandard measures for distance and angle. They use simulations to identify patterns and relationships. Children are encouraged to present their work through a range of computing medium and the use of visualizers greatly enhance pupils teaching and learning experiences across the curriculum.

### **Art**

Some aspects of Art teaching allow children to explore the use of shape, space and pattern, such as using tessellation in artwork.

### **Design Technology**

Within DT, children are encouraged to apply mathematical skills where possible – such as when measuring materials. Within food technology, children may use measurement skills, such as counting or weighing ingredients; food technology also introduces children to the concept of scaling recipes up and down.



## **Music**

In Music, children are encouraged to use their knowledge of number and pattern to understand music notation, rhythm and tempo.

### Pupils with SEN

Mathematics forms part of the school curriculum; it provides a broad and balanced education to all children. Through our mathematics teaching we provide learning opportunities that match the needs of each individual child. Teachers provide learning opportunities matched to the needs of each individual child, work in Maths considers the targets set in their SEN Support Plans.

### Metacognition in Maths

Within all subjects at St John Vianney, teachers employ metacognitive strategies in lessons, which are based upon EEF research and guidance. In Maths, these strategies are evident within lessons, through:

- activating relevant prior knowledge from previous lessons within a Maths topic, across previous Maths topics and previous year group Maths topics (vertical curriculum links);
- activating relevant prior knowledge from other curriculum areas within the current year group (horizontal curriculum links);
- activating relevant prior knowledge from other curriculum areas and year groups (diagonal curriculum links);
- explicit instruction of mathematical strategies, knowledge and skills;
- teacher modelling of mathematical strategies, knowledge and skills, and effective learning behaviours in Maths;
- memorisation of mathematical strategies, knowledge and skills;
- guided practice of tasks in Maths;
- independent practice of tasks in Maths;
- structured reflection upon understanding and learning behaviours, which is seen in Maths, namely through end of lesson discussion and feedback, verbal self-assessment, RAG rating of lessons and journaling activities.

Metacognition is also promoted across whole topics of work, such as through the use of 'Maths Blasts' or topic knowledge organisers where applicable, which encourage children's retention of knowledge by drawing prior learning back into the working memory, building upon it and creating schemas in the long-term memory – the principle behind this being to ensure that learning is not forgotten. 'Maths Blasts' refer children back to learning of previous year groups, topics and lessons. Where applicable in Maths, knowledge organisers allow children to keep track of their previous learning, current learning, where their learning is going next and any key vocabulary for the topic of work they are studying. Journaling activities allow children the opportunity to test and monitor their own learning, which is important in fostering self-regulated learners.

### Planning

We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each project. Planning ensures progression throughout the scheme of work so that the children are increasingly challenged as they move up through the school. Long term planning is compiled across a whole school basis, which is determined by the requirements of

the 2014 National Curriculum and the EYFS Curriculum. Planning is monitored by the Senior Team and the Mathematics team.

### Impact

- Children are engaged and motivated to learn, developing their understanding further.
- Cross curricular links are made and this, therefore, deepens the children's knowledge.
- Children make good progress based on their own developmental stages.
- Children understand that the presentation and quality of work is essential in all areas.

At St John Vianney, we believe that all children should be exposed to high quality first teaching in mathematics lessons. This provides children of all lessons the opportunity to hear and absorb high level mathematical talk and discussion, as well as working collaboratively alongside their peers. Class teaching assistants are skilfully employed to support targeted groups of children within mathematics learning. However, there are incidences in which children benefit from targeted intervention. As far as possible, this intervention takes place outside of mathematics curriculum time, usually in the afternoon. Children work in small groups as directed by the class teacher. Interventions may be used to address misconceptions from previously taught lessons, or may comprise of 'pre-teaching' of concepts to activate prior learning, allowing children to access upcoming maths lessons.

In some year groups, it is appropriate to deliver small group intervention, where there are skilled teachers to lead these interventions. This may be appropriate in year groups as they prepare for end of key stage assessments.

Teachers make appropriate adaptations to the curriculum and their teaching style. This ensures that all pupils regardless of need, are able to access the curriculum and succeed across the curriculum. Within Mathematics, staff use the following Maths No Problem documents to support their planning in order to tailor it towards the needs of their children:

<https://cdn.sanity.io/files/6dc08p2p/production/0f4566e325c2e9a4451f83a44c8add8c0a31c65f.pdf>

<https://cdn.sanity.io/files/6dc08p2p/production/b541596204f6fb93e8c8016370781c9752538e47.pdf>

### Assessment

We assess the children's work in mathematics from three aspects (long-term, short-term and medium-term). We make short-term formative assessments, which we use to help us adjust our daily plans, including highlighting the objective in KS1 and ticking the objective in KS2. These short-term assessments are closely matched to the teaching objectives. Teachers make medium-term assessments to measure progress against the key objectives, and to help us plan the next phase of learning. Assessment in mathematics is structured in the following way: within the Autumn term, staff will use their own teacher assessment paired with Maths No Problem chapter reviews to ascertain each child's progress as they move through the curriculum, following this, children will then complete a mid-year and end of year test which uses the formalised Maths No Problem assessment criteria. This data then enables teachers and senior leaders to set SMART targets and plan intervention. Children may also undertake

the optional national SATS tests in Year 2 and the compulsory Year 6 SATS, as well as the statutory Multiplication Tables Check in Year 4. Moderation in Mathematics is carried out by the subject leader who oversees the regular moderation of work through phase meetings, book scrutiny and lesson observations, carried out at key points in the year. Mathematics is moderated internally within phase groups, which ensures that teachers' judgements are accurate and robust; this process also encourages a dialogue between teachers in different year groups about the progression of mathematics across the school. These internal moderation systems are further enhanced through external moderation through the Catholic family of schools each term. Audits of resources are conducted at yearly intervals and the needs of the subject are met accordingly to facilitate the teaching and learning of mathematics as outlined above. This is additionally incorporated into the school development plan and thereby remains a key priority throughout the year. In November 2021, the maths leads started to work with the NE1 Great North Maths Mastery Hub and the NCTEM to introduce a maths mastery approach to teaching and learning to support the spiral curriculum.

### Monitoring

The Mathematics team are responsible for monitoring the standard of the children's work and the quality of teaching in Maths. The mathematics team is also responsible for supporting colleagues in the teaching of mathematics, for being informed about current developments in the subject, and for providing a strategic lead and direction for the subject in the school. The mathematics team leads gives the headteacher an annual audit in which she/he evaluates the strengths and weaknesses in the subject and indicates areas for further improvement. We allocate specific time for the vital task of reviewing samples of children's work, talking to the children about mathematics and for visiting classes to observe teaching in the subject. These tasks are carried out at least three times a year, with staff being given dedicated time out of class to support this.

### Equal Opportunities

We are committed to providing a teaching environment conducive to learning. Each child is valued, respected and challenged regardless of ability, race, gender, religion, social background, culture or disability, in line with the School Policy for Equal Opportunities.

### Supporting Documents

This policy is to be read in conjunction with and used alongside the subject 3I statement and where appropriate the End of Year expectation document as well as those indicated as hyperlinks throughout the document.

Headteacher's signature \_\_\_\_\_

Mathematics Lead's signature \_\_\_\_\_

Chair of Governor's signature \_\_\_\_\_

Date: Governor approval 30<sup>th</sup> November 2023

Renewal time frame: Revisited every two years

