

# Mathematics Rationale

## Our Vision

### LOVE, LEARN, SHINE.

*SHINE in the light and love of God.*

#### LOVE

We nurture each individual to be happy, healthy and safe, build positive and respectful relationships with others valuing their uniqueness and including everyone.

#### LEARN

We inspire children to a lifelong love of learning, to develop wisdom, knowledge and skills and be fluent, confident learners who are well prepared for life in a diverse world.

#### SHINE

We support children to grow and develop socially, emotionally, physically and spiritually, helping them to shine and share their light enabling themselves and others to flourish.

*'People do not light a lamp and cover it with a bowl or put it under the bed. Instead they put it on a lampstand, so that people will see the light as they come in'.*

*Luke 8 V16.*

## Vision into Curriculum

### ***Our vision translates directly into our curriculum in that:***

Our curriculum promotes a love and appreciation of life and learning enabling children to *SHINE*, realise a passion for what is possible and enjoy life in all its fullness

## National Curriculum Aims and Purposes

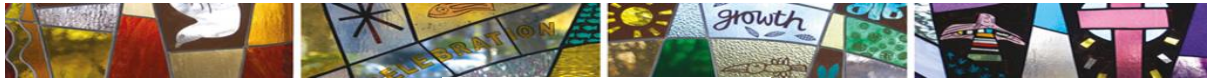
A well planned and effectively implemented curriculum begins with a sound and secure knowledge of the National Curriculum purpose and aims for the subject.

In mathematics are;

### **National Curriculum Purpose Mathematics**

Mathematics is a creative and highly interconnected 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 Aims

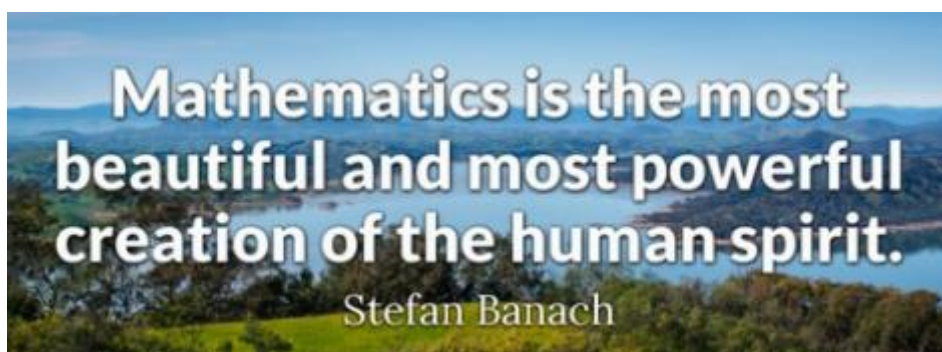
The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

## Quality First Curriculum Implementation in Mathematics

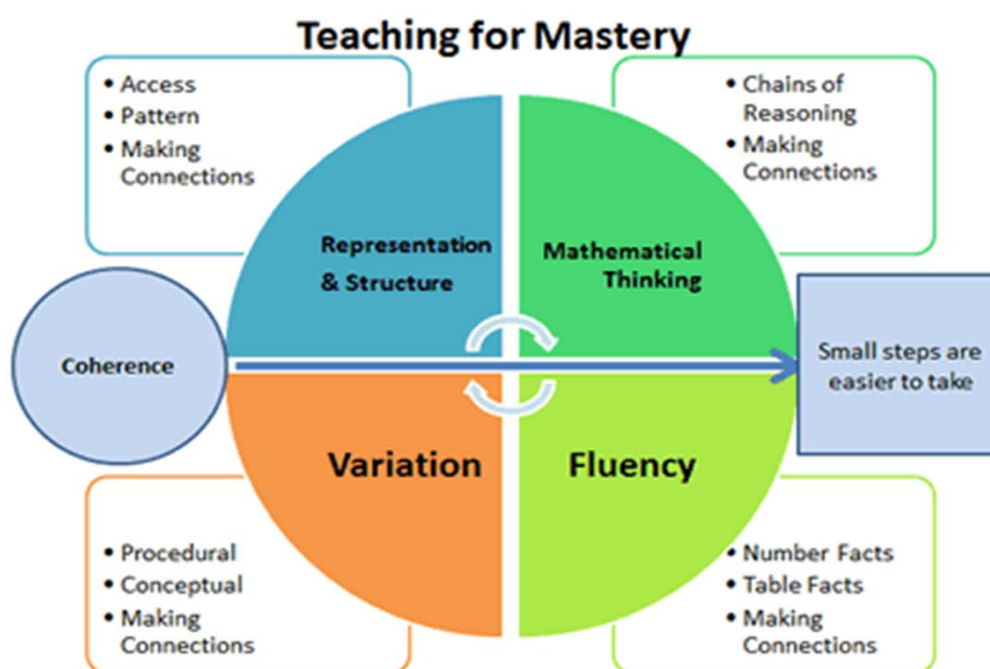


Quality first curriculum implementation in mathematics supports children in becoming secure and fluent in the identified agreed core knowledge and skills in mathematics through a Teaching for Mastery approach (TfM). Our curriculum is delivered using the NCETM's Curriculum Maps and is supplemented by the delivery of both the NCETM's KS1 (focus on additive facts and relationships) and KS2 (focus on multiplicative facts and multiplicative





thinking) Mastering Number programmes. The Teaching for Mastery approach describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering mathematics. Please see the five fundamental elements diagram (5 Big Ideas) below, that underpins TfM. Fluency and security in core knowledge mean pupils acquire a deep, long-term, secure and adaptable understanding of the subject. In order for concepts to be mastered, concepts are taught through small, coherent, manageable steps with plenty of opportunity for challenge through rich and sophisticated problems. Mistakes and misconceptions are seen as an essential part of learning and fostering positive can-do attitudes promote the fact that, 'We can all do maths!'



Mathematics is essential to everyday life; it is an important creative discipline that helps us to understand and change the world. It is critical to science, technology and engineering, necessary for financial literacy and most forms of employment. Every pupil will have the opportunities to experience the beauty, power and enjoyment of mathematics and develop a sense of curiosity about the subject with a clear understanding. sophisticated problems. At our school, the majority of children will be taught the content from their year group only. They will spend time becoming true masters of content, applying and being creative with new knowledge in multiple ways.

The first few years of a child's life are especially important for mathematics development. Research shows that early mathematical knowledge predicts later reading ability and general education and social progress. Building firm mathematical foundations begins in Early Years





through high quality provision that is engaging and appropriate for their age. The six key areas of mathematical learning (cardinality and counting, comparison, composition, pattern, shape and space and measures) collectively provide a platform for everything children will encounter as they progress through their maths learning into KS1 and beyond.

By the end of KS2 children should have developed the knowledge and skills to be able to solve a wider range of problems, including those with increasingly complex properties of numbers and arithmetic that demand efficient written and mental methods for calculation. Through repeated intelligent practice and well-crafted varied fluency activities, children will have embedded core number facts, freeing up capacity in their working memories to tackle new, more complex problems and concepts. They will be able to classify shapes with complex geometrical properties and be fluent in working with fractions, decimals and percentages. The use of core representations and structures to support pupils to reason mathematically and understand key mathematical structures is embedding throughout the school. This depth of understanding supports and prepares children well as they move on to KS3.

### **Essential Characteristics of Mathematics**

A feature of our curriculum design is the use of Essential Characteristics. These are the learning characteristics developed through the subject overtime. They act as a common thread between all the mathematical concept taught and developed from Early Years to Year 6.

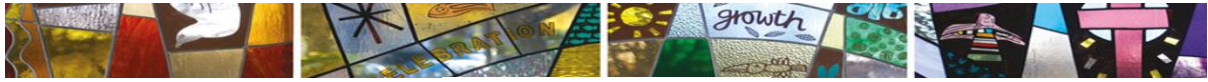
- An understanding of the important concepts and an ability to make connections within mathematics.
- A broad range of skills in using and applying mathematics.
- Fluent knowledge and recall of number facts and the number system.
- The ability to show initiative in solving problems in a wide range of contexts, including the new or unusual.
- The ability to think independently and to persevere when faced with challenges, showing a confidence of success.
- The ability to embrace the value of learning from mistakes and false starts.
- The ability to reason, generalise and make sense of solutions.
- Fluency in performing written and mental calculations and mathematical techniques.
- A wide range of mathematical vocabulary.
- A commitment to and passion for the subject.

### **Knowledge in Mathematics**

In order to master mathematics, children need a secure deep conceptual understanding with a focus on exposing the structure of mathematics and developing the knowledge of how it works is crucial. Concrete materials, contexts, drawings, diagrams and equations all play a role. These are discussed through opportunities for pupil-pupil and pupil-teacher talk, to develop reasoning, flexibility and adaptability in mathematical thinking.

Memorisation and repetition of key facts (times tables and number bonds etc.) are important aspects of learning. We call this procedural fluency. Evidence from cognitive science research suggests that learning key facts so they can be recalled automatically 'frees up' working





memory. It can then focus on more complex problem solving, rather than reaching cognitive overload trying to calculate simple operations.

Learning is most effective when conceptual understanding and procedural fluency are fully integrated.

### **Mathematical Language**

Teaching children precise mathematical language and insisting upon its use supports children's ability to think mathematically. Having the language and using it empowers children's ability to think about the concept.

### **SEND**

Wherever possible or appropriate children with SEND access mathematics along with their peers as we recognise the importance for all our children to access our curriculum in line with our curriculum design principles.

For some children with SEND, particularly those with high needs, access to mathematics is considered along with ensuring they have access to their personalised or adjusted curriculum. For example, enabling access to specialist programmes such as those advised by speech and language therapists, occupational therapy programmes or the SEN Hub. These programmes are timetabled to minimise the impact on the child's access to a broad and rich curriculum. Typically, these programmes are identified in EHCPs and ILPs and curriculum adaptations are agreed with parents.

Higher attainers in this subject are challenged to ensure they become fluent with the core key concepts through additional questioning and tasks (in the form of Golden Challenges) which helps extend their reasoning skills as well as supporting them to engage in creating, evaluating, and analysing, delving deeper into the subject content.

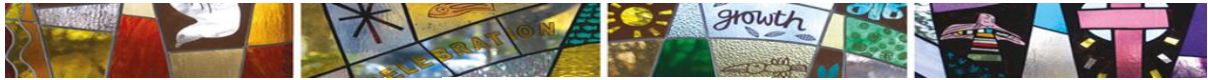
For children with SEND, access to the learning in mathematics in lessons may need to be differentiated and scaffolded, whilst the planned, progressive curriculum content is retained. Children are supported to succeed through:

- Breaking down tasks into smaller chunks to achieve and prioritising understanding over task completion
- Giving sufficient time to process instructions, or adapted verbal or written instructions
- A concrete, pictorial and abstract approach is used and embedded across the school to support all children to master the curriculum
- Scaffolded questions from adults and orally rehearsing thoughts with an adult
- Same-day intervention is used as a rapid tool to ensure that no child is left behind and the children can move through the curriculum at broadly the same pace in line with the aims of the National Curriculum
- Where appropriate or necessary, pre-teaching core vocabulary or concepts
- Resources that support reduced cognitive load

### **Monitoring and Assessment in Mathematics**

Assessing children's progress is vital in order to establish their acquisition of knowledge and skills is building confidence and fluency in all subjects. At St Peter's learning always starts with the





children's prior knowledge and any misconceptions they may have. Class teachers decide upon the most appropriate age-related way of obtaining the children's prior knowledge. Misconceptions that arise throughout the unit are identified and addressed appropriately by the teacher. Mistakes are used as learning points.

In Early Years, assessment happens continually to collect consistent and varied evidence of mastery. This then feeds into the continuous cycle of Observation, Assessment and Planning. In addition, children are informally assessed day to day by the class teacher with rapid support and intervention in place to support children who need it.

Summative assessments are in the form of termly progress (NTS) tests. These allow teachers to compare children with national expectations. In addition, these tests provide detailed analysis of where the children may be exceeding or where teachers may need to put in more deliberate practice of a concept. Catch up suggestions are embedded within these results. They will also allow teachers to adjust their provision where needed on a termly basis.

In years 2 and 6, children will be given practice SATs papers at various intervals during the school year to ensure familiarity with test style and to reduce anxiety. In Year 2, these are typically used in the spring term. In Year 6, these are typically used in October, February and April. In year 4, progress towards the multiplication check test will be measured by completing practice checks in January, April and June. In all year groups, daily informal assessments happened and rapid support and intervention is used to ensure that those children that need extra time to understand are concept are given it.

