Mathematics Vision Statement

1. Subject: Mathematics

2. Subject Leader: Mrs Maloney

3. Link Governor: Gary Booth

4. Why is maths important?

Mathematics is a beautiful subject which has its own unique place in the curriculum at St Helens Primary School. It provides learners with powerful ways to describe, analyse and change the world. Children can experience a sense of awe and wonder as they solve a problem for the first time, discover a more elegant solution and make links between different areas of mathematics.

Mathematics is the means of looking at the patterns that make up our world and the intricate ways in which they are constructed and realised. The language of mathematics is international. The subject transcends cultural boundaries and its importance is universally recognised. Mathematics helps us to understand and change the World.

Mathematics makes a significant contribution to modern society;

- the basic skills of mathematics are vital for the life opportunities of our children;

- mathematics develops the mind and those highly valued cognitive skills.

Learners at St Helens Primary School study mathematics to become functioning adults who are able to think

Vision for teaching and learning Mathematics

"Good mathematics teaching is lively, engaging and involves a carefully planned blend of approaches that direct children's learning….the pitch and pace of the work is sensitive to the rate at which children learn while ensuring expectations are kept high and progress is made by all children"

(The Primary National Strategy)

At St Helens Primary School we aspire to achieve this vision for the teaching and learning of mathematics.

5. Aims

- To implement the current legal requirements of the Early Years Foundation Stage (EYFS) and the National Curriculum (NC), through the use of the Early Years Foundation Stage Curriculum Guidance and the Primary Framework for Mathematics.
- To foster positive attitudes, fascination and excitement of discovery through the teaching and learning of mathematical concepts.
- For our children to develop a 'can do' attitude and perceive themselves as mathematicians.
- To broaden children's knowledge and understanding of how mathematics is used in the wider world.

- For our children to use and understand mathematical language and recognise its importance as a language for communication and thinking.

6. What then is our intent and ambition for all pupils in maths?

- That students 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 nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

7. <u>Early Years Foundation Stage</u>

Maths is one of the four specific areas within the Early Years Foundation Stage (EYFS). Each specific area is divided into Early Learning Goals, for maths these are:

- **Numbers - children learn to count and the value of numbers, higher and lower. These skills support them to solve problems, use money and calculate more or less.**
- **Shape, Space and Measure - these skills support children to understand size, weight, capacity, position, distance, time and money and compare quantities, objects and solve problems.**

8. **Subject Content**

In 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.

- *Please refer to for detailed subject content Mathematics programmes of study: key stages 1 and 2: National curriculum in England.*

- **In Key stage 2**

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.

- *Please refer to for detailed subject content Mathematics programmes of study: key stages 1 and 2:National curriculum in England.*

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

- *Please refer to for detailed subject content Mathematics programmes of study: key stages 1 and 2:National curriculum in England*

9. Key concepts and skills – how are we going to get there?

Key concepts are that all children can achieve in mathematics, using one curriculum and focusing on achieving depth and mastery by using concrete, pictorial and abstract representations. Furthermore by problem solving using reasoning which then leads to fluency.These concepts are detailed below.

Mastery in maths at KS1 and KS2

What does it mean to *master* mathematics?

A mathematical concept or skill has been **mastered** when

- a pupil can represent it in multiple ways
- has the mathematical language to communicate related ideas
- and can independently apply the concept to new problems in unfamiliar situations.

Mastery is a journey and long-term goal, achieved through exploration, clarification, practice and application over time. At each stage of learning, pupils should be able to demonstrate a deep,

conceptual understanding of the topic and be able to build on this over time.

This is not about just being able to memorise key facts and procedures, which tends to lead to superficial understanding that can easily be forgotten. Pupils should be able to select which mathematical approach is most effective in different scenarios.

All pupils can achieve in mathematics

A positive teacher mindset and strong subject knowledge are key to student success in mathematics. It is not the case that some pupils can do mathematics and others cannot.

No pupil should be left behind. The focus is keeping up over catching up. By making high expectations clear and emphasising the value of mathematics education, pupils are encouraged to build confidence and resilience.

Abilities are neither fixed nor innate, but can be developed through practice, support, dedication and hard work. Natural talent is just a starting point and does not determine who has more or less potential to achieve. A positive teacher mindset in maths encourages a love of learning and resilience that enables everyone to achieve.

One curriculum

All pupils are entitled to learn key concepts and skills

A scheme of work based around the principles of mastery really can be suitable for all. Pupils should have the opportunity to stay together and work through new content as a whole group. While mastery schemes of work may be challenging for some, the vast majority should be aiming for this standard. In extreme cases,

where students have considerable learning difficulties, individual schools may want to put some alternatives in place.

It is important that high-attaining pupils fully understand key number concepts, rather than simply memorise a process. This will reap its rewards in the future at KS3, GCSE and A-level. Teachers can extend high-attaining students through depth, as opposed to acceleration onto new content.

Focus on depth

Deepen understanding before accelerating content coverage

All pupils benefit from deepening their conceptual understanding of mathematics, regardless of whether they've previously struggled or excelled. Pupils must be given time to fully understand, explore and apply ideas, rather than accelerate through new topics. This approach enables pupils to truly grasp a concept, and the challenge comes from investigating it in new, alternative and more complex ways.

Multiple representations for all

Concrete, pictorial, abstract

Objects, pictures, words, numbers and symbols are everywhere. The mastery approach incorporates all of these to help pupils explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding. Together, these elements help cement knowledge so pupils truly understand what they've learnt.

All pupils, when introduced to a key new concept, should have the opportunity to build competency in this topic by taking this approach. Pupils are encouraged to physically represent

mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols.

Concrete – Students should have the opportunity to use concrete objects and manipulatives to help them understand and explain what they are doing.

Pictorial – Students should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.

Abstract – With the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.

Problem solving, Reasoning and Fluency

Problem solving

Mathematical problem solving is at the heart of our approach. Pupils are encouraged to identify, understand and apply relevant mathematical principles and make connections between different ideas. This builds the skills needed to tackle new problems, rather than simply repeating routines without a secure understanding.

Mathematical concepts are explored in a variety of representations and problem-solving contexts to give pupils a richer and deeper learning experience. Pupils combine different concepts to solve complex problems, and apply knowledge to real-life situations.

Reasoning

The way pupils speak and write about mathematics transforms their learning. Mastery approaches use a carefully sequenced, structured

approach to introduce and reinforce mathematical vocabulary. Pupils explain the mathematics in full sentences. They should be able to say not just what the answer is, but how they know it's right. This is key to building mathematical language and reasoning skills.

Fluency

Pupils should be able to recall and apply mathematical knowledge both rapidly and accurately. However, it is important to stress that fluency often gets confused for just memorisation – it is far more than this. As well as fluency of facts and procedures, pupils should be able to move confidently between contexts and representations, recognise relationships and make connections in mathematics. This should help pupils develop a deep conceptual understanding of the subject. Frequent, carefully designed, intelligent practice will help them to achieve a high level of fluency.

10. Links with other subjects

English

There are many opportunities across all year groups for children to further develop their English skills through their mathematical learning. Speaking and listening is an integral part of the way that mathematics is taught at St Helens and children are encouraged daily to ask and answer questions and discuss with partners how they have solved a calculation or what is the most appropriate strategy to use. Being able to verbally explain a problem embeds the strategies and reasoning used. Children are expected to write numbers in words and use other mathematical vocabulary with accuracy, eg shape names.

Science

Maths naturally has clear scientific links, children use and apply mathematical knowledge in examples such as:

Creating tally charts to collect data, presenting data through block graphs and bar charts, using Venn diagrams to sort and classify objects/animals/materials, using measures to carry out investigations, reading scales when using scientific equipment, understanding temperatures and negative numbers, producing line graphs from the collection of continuous data

Without the skills learnt in mathematics sessions, measurements are not going to be accurate. Without knowledge of presentation of data in graphs and tables results become unwieldy and difficult to interpret.

Computing

Computing enhances our teaching of mathematics wherever appropriate in all key stages. The children use computing in mathematics a variety of ways. In particular times table based websites such as Times Table Rockstars are regularly used across the key stages to enhance the learning of times tables.

Art /Design and Technology

Mathematics and art have many links in terms of practical activities For example could children identify the different shapes and angles in objects found in and outside the classroom? Perhaps they can measure and record the shapes and angles they find in nature, and use them to create a piece of abstract art, or a still life. This will help make the link between the mathematical principles of shape, and the aesthetic principles of composition. Accurate measurement is crucial in Design Technology.

History and Geography

There are obvious links with key historical figures in mathematics. These may be considered particularly as part of an annual maths week focus. However discreet historical teaching directly links to mathematics; namely Greeks and the Romans and their impact on our lives with the lasting legacy of Archimedes and Roman numerals.

11. British Values

At St Helens Primary School we ensure that the teaching of geography links directly to our British values by giving the children the opportunities to;

Democracy

- Take the views and opinions of others into account · Take turns and instructions from others

The rule of law

- Understand the importance of safety rules when working scientifically
- Know that there are consequences in rules are not followed

Individual liberty

- Make choices when planning an investigation
- Others may have different points of view as to where to start

Tolerance

- Scientific discoveries have come from other cultures
- Religious beliefs often compete with scientific understanding

Mutual respect

- Work as a team
- Discuss findings
- Offer support and advice to others