Maths Framework Intent Document

At South Kilworth C of E Primary School our aim is to develop lifelong mathematicians who are able to make sense of the world around them through developing their ability to calculate, reason and problem solve. Mathematics is essential to everyday life, critical to science, technology and engineering and necessary for finial 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. We aim to support children to achieve economic well-being and equip them with a range of computational skills and the ability to solve problems in a variety of contexts.

We want our all pupils to:

- Become **fluent** in the fundamentals of mathematics, so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately, including the varied and regular practice of increasingly complex problems over time.
- **Reason mathematically** by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.
- Be able to solve **problems** by applying their mathematics to a variety of problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions – including unfamiliar contexts and real-life scenarios.

Maths will be taught in a Mastery style with teachers teaching the skills the children need to learn. At our school, the majority of children will be taught the content from their year group. They will spend time becoming true masters of content, applying and being creative with new knowledge in multiple ways. Teaching will consist of a mixture of fluency, reasoning and problem solving. All three are important and should be shown in books regularly.

Use of appropriate vocabulary is modelled throughout lessons by both staff and children, allowing everyone to 'talk like a mathematician'. Once a child can articulate their understanding of a concept, they can truly begin to make connections within their learning.

Teachers will use hinge points in lessons to understand which children are ready to move on to or to extend their learning in greater depth activities. Conceptual variation and procedural variation are used extensively throughout teaching. (Conceptual variation is where the concept is varied and there is intelligent practice. Procedural variation is where different procedures and/or representations are used to bring about understanding.) This helps to present the mathematics in ways that promote deep, sustainable learning.

Sequence and Structure

We follow the National Curriculum, which sequences and structures the teaching into the year groups. In order to ensure this curriculum is covered in full and in manageable and logical steps,

we follow the White Rose planning in EYFS, KS1 and KS2. The progression is clearly structured and available to see under this **'progression' link** or by visiting our school website.

Our maths teaching and learning is underpinned by the following key messages:

*Everyone can learn maths

*Mistakes help us to learn

*Asking questions helps deepen our understanding

*Maths is about being creative and making connections

*Maths is about being fluent and flexible

*Understanding maths is much more important than how fast you are

*The steps that you take when finding the answer are just as important as the answer.

(Messages developed by Jo Boaler Professor of Mathematics Education, Stanford University).

Times Tables:

Times tables need to be practiced regularly to ensure that children both learn and retain all times tables they have learn/ are learning from current and previous years. All children need to be fluent in all times tables by the summer of Year 4. This means they are able to answer both times tables and division facts up to 12x12 in less than 6 seconds. In year 5 and 6 children need to continue to regularly practice times tables to ensure they retain this skill. Times Table Rock Stars is used to support the teaching of times tables

Tables to be known by heart by the end of the year;

Year Group	
1	10x
2	2x 5x 3x
3	4x 8x 6x 11x
4	7x 9x 12x
5	25x revision and fluency, including division facts
6	revision and fluency, including place value

In Reception and Year 1 children will focus heavily on learning number bonds.

We have clear expectations for our pupils please see Appendix 1.

Expectations

Area	By the end of EYFS	By the end of YEAR 2	By the end of YEAR 6
Number and Place Value	Children will be able to: • subitise up to 5 • verbally count to 20 and beyond. • compare qualities up to 10, using the words greater than and less than or the same as	Children will be able to: • count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward • recognise the place value of each digit in a two-digit number (10s, 1s) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use <, > and = signs • read and write numbers to at least 100 in numerals and in words • use place value and number facts to solve problems	Children will be able to: • read, write, order and compare numbers up to 10,000,000 and determine the value of each digit • round any whole number to a required degree of accuracy • use negative numbers in context, and calculate intervals across 0 • solve number and practical problems that involve all of the above

Addition and Subtraction	• know number bonds to 5 (including subtraction facts)
	• Learn some number bonds to 10
	• Learn some doubles to 10
	• make an equal group
		Pupils should be taught to:
		
		• solve problems with addition and subtraction:
		  • using concrete objects and pictorial representations, including those involving numbers, quantities and measures
		  • applying their increasing knowledge of mental and written methods
		• recall and use addition and subtraction facts to
			• multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
			• divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

		20 fluently, and derive and use related facts up to 100
		• add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
		  • a two-digit number and 1s
		  • a two-digit number and 10s
		  • 2 two-digit numbers
		  • adding 3 one-digit numbers
		• show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot
		• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems
			• divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
			• perform mental calculations, including with mixed operations and large numbers
			• identify common factors, common multiples and prime numbers
			• use their knowledge of the order of operations to carry out calculations involving the 4 operations
			• solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
			• solve problems involving addition, subtraction, multiplication and division

Multiplication and division	• share and group objects less than 10	• recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • show that multiplication of 2 numbers can be done in any order (commutative) and division of 1 number by another cannot • solve problems involving multiplication and	• use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

		division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts	
Fractions	• find odd and even numbers • find half	• recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity • write simple fractions, for example $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$	• use common factors to simplify fractions; use common multiples to express fractions in the same denomination • compare and order fractions, including fractions >1 • add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] • divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] • associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$] • identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places • multiply one-digit numbers with up to 2 decimal places by whole numbers • use written division methods in cases where

			the answer has up to 2 decimal places
			• solve problems which require answers to be rounded to specified degrees of accuracy
			• recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
Measurement	• talk about time. Daytime, night-time.	• choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • compare and order lengths, mass, volume/capacity and record the results using >, < and = • recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value • find different combinations of coins that equal the same amounts of money • solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change • compare and sequence intervals of time • tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a	• solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate • use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3 decimal places • convert between miles and kilometres • recognise that shapes with the same areas can have different perimeters and vice versa • recognise when it is possible to use formulae for area and volume of shapes • calculate the area of parallelograms and triangles • calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other

		• clock face to show these times • know the number of minutes in an hour and the number of hours in a day	units [for example, mm³ and km³]
Geometry – properties of shape	• name 2D shapes, including square, rectangle, circle and triangle. • talk about the properties of 3D shapes	• identify and describe the properties of 2-D shapes, including the number of sides, and line symmetry in a vertical line • identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces • identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] • compare and sort common 2-D and 3-D shapes and everyday objects	• draw 2-D shapes using given dimensions and angles • recognise, describe and build simple 3-D shapes, including making nets • compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
Geometry – position and direction		• order and arrange combinations of mathematical objects in patterns and sequences • use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)	• describe positions on the full coordinate grid (all 4 quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes
Statistics		• interpret and construct simple pictograms, tally	• interpret and construct pie charts and line graphs

		charts, block diagrams and tables • ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity • ask-and-answer questions about totalling and comparing categorical data	and use these to solve problems • calculate and interpret the mean as an average
Ratio			• solve problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts • solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison • solve problems involving similar shapes where the scale factor is known or can be found • solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
Algebra			• use simple formulae • generate and describe linear number sequences

			- express missing number problems algebraically - find pairs of numbers that satisfy an equation with 2 unknowns - enumerate possibilities of combinations of 2 variables