St. Mary's Catholic Primary School
Maths Intent, Implementation and Impact

Intent

The study of Mathematics develops children's abilities to make sense of the world around us through developing a child's ability to calculate, to reason and to solve problems. It enables children to understand and appreciate relationships and pattern in both number and space 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. Children use and apply their knowledge, skills and understanding in a range of different situations. We aim to ignite children's love of Mathematics through activities and learning both indoors and outdoors.

We want all children to have confidence in their Mathematical abilities and develop into enthusiastic and successful problem solvers, ready for the next stages in their school careers and academic stages of development. We aim to make mathematics an exciting and varied experience to enable children to flourish and achieve.

EYFS children are given every opportunity to develop their love of Mathematics through immersing themselves in the new Caterpillar room and they have a range of resources specifically to enhance the teaching and learning of Mathematics. We want children in the EYFS to have a hands-on experience and have an understanding of mathematics through a 'mastery readiness' approach, understanding number through a variety of mediums.

Our medium and long term plans and sequencing of lessons follow the White Rose mastery approach (Reception through Year 6) where the goal is to deepen understanding so that each lessons builds upon the last. Mathematical concepts and skills are broken up across the key stages. A concept is taught and will be revisited the following year, but in greater depth in order to build upon prior knowledge. We start with number (place value, addition/subtraction, multiplication/division [KS2]) which is consolidated first before moving on to measurement, statistics and geometry. This is important as the children will then be able to use their number skills and then apply it to the other mathematical disciplines. A progression map for each area for maths is used by the teachers so that they understand the steps of progression required to build on learning. We use the DfE 'Ready to Progress' criteria to support children who have gaps in knowledge and need tailored support based at their individual level. We tailor our sequential plans to individual classes and needs, using White Rose Maths mixed age planning.

Staff are aware and sensitive to the needs of all pupils. We ensure that all pupils have access to the curriculum and utilise a wide range of maths manipulatives that are demonstrated in the White Rose approach. Based on the mastery approach, pupils who are sound with their fluency deepen their understanding with reasoning and problem solving. Pupils who are struggling to grasp a concept will have a teacher working and checking in with them during the lesson. They will also have the opportunity to revise it with the teacher or teaching assistant prior to the next

lesson. Each pupil is catered to with differentiated learning within the scope of each lesson. With mixed age classes, teachers are flexible of their delivery of lessons to ensure that all children make progress each lesson. We also use short term interventions to aide catch up and extension activities are offered to extend learning.

First and foremost, we focus on effective and quality teaching for all. Then we differentiate using White Rose or White Rose equivalent work so that all pupils may access the curriculum regardless of disadvantages or SEND. We also utilise maths manipulatives, set out visual reminders, have one-to-one sessions, workshop groups using teaching assistants as support, to help support these pupils. We make it a priority to "know" our children and what motivates them and to "know" the curriculum to ensure the teaching staff understand the progression in maths learning and the likely misconceptions.

In the long term we would like to continue developing a deeper understanding for the teaching staff's pedagogical knowledge. We are also working on incorporating more reasoning and problem solving across the school as this has been identified as an area of need. Our next step is to embed the CPA approach, which we have CPD training for all staff using the White Rose Maths training. We will scheduled further training for all staff in the summer term.

Key Stage 1

Knowledge	Skills
By the end of KS1, pupils will be able to: **Number** • count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward • recognise the place value of each digit in a two-digit number (tens, ones) • identify, represent and estimate numbers using different representations, including the number line • read and write numbers to at least 100 in numerals and in words • use place value and number facts to solve problems.	• Pupils to have developed fluency skills, enabling them to manipulate simple number mentally, physically, practically and begin to use these skills when problem solving. • compare and order numbers from 0 up to 100; use <, > and = signs
Addition and Subtraction add and subtract numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones • a two-digit number and tens • two two-digit numbers • adding three one-digit numbers • show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	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 20 fluently, and derive and use related facts up to 100

• recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	
Multiplication and Division • 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 two numbers can be done in any order (commutative) and division of one number by another cannot	• solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Fractions • recognise, find, name and write fractions of a length, shape, set of objects or quantity • write simple fractions and recognise the equivalence	
Measurement • 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 • recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value • tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times • know the number of minutes in an hour and the number of hours in a day.	• compare and order lengths, mass, volume/capacity and record the results using >, < and = • 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
Geometry (Shape) • 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.
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 anticlockwise). **Statistics** • interpret and construct simple pictograms, tally charts, block diagrams and simple 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.	• interpret and construct simple pictograms, tally charts, block diagrams and simple 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.

Key Stage 2

Knowledge	Skills
By the end of KS2, pupils will be able to: **Number and Place Value** • 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 zero	• Pupils to have embedded fluency skills, enabling them to manipulate number mentally, physically and using appropriate methods, and apply this to real life contexts. • solve number and practical problems that involve all of the above.
Four Operations • 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 • 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 four operations • solve addition and subtraction multistep problems in contexts, deciding which operations and methods to use and why • solve problems involving addition, subtraction, multiplication and division • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Fractions • 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 • divide proper fractions by whole numbers • associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction • identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to three decimal places • multiply one-digit numbers with up to two decimal places by whole numbers	
Ratio and Proportion • solve problems involving the relative sizes of two 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.	• solve problems involving the relative sizes of two 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 two unknowns • enumerate possibilities of combinations of two variables.	
Measurement • 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,	• solve problems involving the calculation and conversion of units of measure, using decimal

using decimal notation to up to three 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 **Geometry (Shape)** • draw 2-D shapes using given dimensions and angles • recognise, describe and build simple 3- D shapes, including making nets • 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)** • describe positions on the full coordinate grid (all four quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes. **Statistics** • interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average.	notation up to three decimal places where appropriate • 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 units [for example, mm^3 and km^3]. • compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average.

Implementation

Teaching across the school is a gradual progression. EYFS start with working with concrete manipulatives, and using fine and gross motor skills for real-life maths. There are significant links made to everyday life and can be seen through continuous provision. We have a continuous provision for maths in the caterpillar room, to stimulate, challenge and support mathematical learning and the characteristics of learning. We are part of the National NNW Maths Hub – with a focus on Readiness for Mastery. This is implemented across EYFS and KS1 to support in the foundational development of understanding number to ensure children at this fundamental stage are secure with number before moving on – to support progression of learning and understanding. Being part of the Hub was put in place due to lockdown and the impact of covid on the youngest children in school. By working with experts and other teachers across the north west, we can identify the needs of the children and support them with a well- thought out curriculum.

In KS1 there is a large emphasis on concrete manipulatives, connections to everyday life, repetition and consolidation of basic number skills that can be applied to calculations. Working with the Maths Hub supports staff in Class 1 have a greater understanding of the fundamental

requirements to support children to ensure they make the best possible progress, with secure understanding.

In KS2 calculations are secured, and there is an emphasis on reasoning and problem solving to deepen understanding. Fluency, reasoning and problem solving are usually seen within a lesson. Times tables are consolidated to the 12 times table by Year 4 who prepare for the MTC. Manipulatives are still used for place value, number, decimals, weight, shape (2D and 3D) when and where it is required for children. Manipulatives are available for each lesson, where children can pick and choose manipulatives to support their own understanding. Maths tools such times table grids, 100s square and place value chart are also used. Across the school, manipulatives are used during many lessons, introductory question(s) that links to the previous lesson before beginning the next step, discussions about problems and strategies, differentiated work, purposeful questioning, linking to real life and cross-curricular maths to support topic work.

There is staff training led by maths coordinator (maths learning walls, challenges tailored to all children, mastery maths, changes to the calculation policy). Following a staff feedback, staff have also been provided with training to support their understanding of concrete, pictorial and abstract within the calculations policy, and how using this approach can support children; this has been done through White Rose Maths, to keep continuity between training and the curriculum.

We hold a range of subscriptions of sites to help provide additional mathematical and problem-solving resources: Classroom Secrets, Learning By Questions, Twinkl, Times Table Rockstars, Prodigy Maths, White Rose Maths (full package of resources). We review our subscriptions to ensure that these are accessible to the targeted children and that they pitched at the appropriate level. Pupils use the post assessments from the White Rose Maths half-termly assessments and end of unit assessments. The bespoke tracker is updated termly and progression meeting take place between the SLT and teachers; using the tracker it allows the school to identify strengths and weaknesses of the maths curriculum as well as gaps in children's - this allows us to inform future planning. Due to our detailed knowledge of understanding of each child, we create personalised interventions for pupils to target areas of development. Here interventions through quality first teaching, small group interventions, targeting questioning in the classroom as through using learning by questions are used to support progression. Through pupil progress meeting, there is regular evaluation of progress through termly book and planning scrutiny meetings with time to revisit/address any gaps if necessary (though many of these meetings had been put on hold this year and last due to covid restrictions).

Maths working walls may include specific vocabulary, good examples of work, Steps to Success, appropriate resources for children to use, etc. This is dependent on the teacher's assessment of their class' needs. Formal assessment is used to identify any holes that need to be reviewed during consolidation weeks. Conversely, it can be used to identify areas that have good fluency but need a deepening of understanding. Informal teacher observations are used each lesson to see if anything needs to be reviewed the following day prior to starting a new lesson or in place of a beginning a new lesson. This comes in the form of questioning, review of classwork, observing children during independent work for skills and confidence levels, etc.

Impact
Progression is mapped out through the school using long term planning, which shows what topics are covered across each year group. We utilise summative assessments each half term (White

Rose Assessments) and end of unit assessements. We also use student self-assessments to understand where pupils feel they are in their learning journey. Books show progress for each child over time and in lessons by: having work that is pitched at the right level, it gets increasingly challenging, there is verbal or written feedback recorded to address misconceptions. If there were books (individual or a cohort) where progress is not evident then a coaching conversation with the member of staff would take place as well as a talk with the pupil(s) to address the issues. At the end of KS1 and KS2 students will be in line with national (expected and greater depth) with progress and attainment to be at least good across KS1 and KS2.

Most pupils will have a love of maths. Pupils will able to have discussions and "think mathematically" and use skills such as reasoning, generalising and working systematically. Utilising Cultural Capital, our children learn maths as something that is fundamentally useful and can link it to real life situations (keeping track of time, financial matters, graphs depicting geographical/historical/scientific information [e.g. climate change], patterns in art, etc.).
The maths curriculum is monitored and evaluated across the school by:

- o Lesson observations with specific feedback and targets are conducted
- o "Book looks" with specific and purposeful criteria
- o Interviewing teachers and students
- o Pupil Profile discussions
- o Data on the assessment spreadsheets for both the White Rose maths and the internal tracker.