Progression in Maths

Who's who?
Subject Leader: Mrs Hayton
Teaching staff: Mrs Watts, Mrs Lancaster, Mr Armstrong, Mrs Hayton, Mrs Tinniswood, Miss Dixon

Our Aims

At Rosley C of E School we empower our children with an 'Aim High', positive attitude for life-long learning in mathematics. We encourage children to work in a variety of ways to deepen their knowledge and understanding, so they can leave us as confident, skilled and resilient mathematicians; who understand that mathematics is a fundamental part of everyday life and the world we live in.

We aim that all pupils become confident in selecting the strategies and resources they need to help them solve problems. They articulate their reasoning and understanding when faced with increasingly complex problems and become secure in the fundamentals of mathematics, developing their ability to recall and apply knowledge rapidly and accurately. We want all our pupils to enjoy maths and carry on this enthusiasm to later life.

Our pupils' ask us for mathematics that challenges everyone and gives them time to check and revisit problems. That allows them to share their ideas and tackle problems by working in groups, pairs and independently and is exciting, active and fun, taking place inside and outside the classroom.

YEAR A 2021 – 2022

YEAR RECEPTION		
TERM	**UNIT OF STUDY**	**LEARNING/KEY SKILLS**
Autumn	**Numbers to 5**	• Recognise numbers 1-5 • Identify basic 2D shapes • Recognise 1p, 2p and 5p coins • Be able to continue a two-step repeating pattern • Understand number conservation (eg, however you arrange three objects, there are still only three objects) • To use the terms 'bigger' and 'smaller' • Subitise to 5

		• Order numbers to 5 • Count forwards and backwards to 5 • Partition numbers to 5 • Use informal jottings to record number / quantities • Number bonds to 5 • Compare quantities using terms 'more', 'less' and 'fewer' • Say the number that is one more / one less to 5 • Sort objects based on shape, colour or size • Sorting the same objects in different ways
Spring	**Numbers to 10** **Shape** **Measurement** **Numerical patterns** **Time**	• Recognise zero • Review numbers 1-5 • To recognise numbers 1-10 • Consolidate 2D shapes • Introduce 3D shapes • Consolidate sorting • Partition and combine numbers to 5 • Introduce Part/Part/Whole method • Weight using balance scales • Subitise numbers to 10 • Capacity • Doubling and halving numbers to 10 • Introduce length and measure • Partitioning into equal groups • Adding and subtracting 1 • Number bonds to 10 • Introduce 10p coin and ways of making 10p using coins already introduced • Odd/Even numbers • Time – routines including yesterday, today, tomorrow, before, after

Summer	**Numbers to 20** **Numerical patterns** **Measurement** **Time**	• Review numbers 1-10 • Recognise numbers 11-20 • Introduce concept of one 10 • Count forwards and backwards from different numbers • Place value (one 10 and how many 1's) • Arrays • Double and halve numbers to 20 • Introduce = sign • Identify odd and even numbers to 20 • Measure using standard and non-standard units of length • Identify times on a clock using o'clock and relate to events that happen during the day

YEAR 1 & 2		
TERM	**UNIT OF STUDY**	**LEARNING/KEY SKILLS**
Autumn 1	**Number: Place Value** **Number: Addition & Subtraction**	• Count in steps of 1, 2, 3, and 5 from 0, and in tens from any two-digit number, forward or backward • Compare and order numbers from 0 up to 100; use <, > and = signs • 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 • Recognise the place value of each digit in a two-digit number (tens, ones) • Use place value and number facts to solve problems • Recall and use addition and subtraction facts to 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 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 • Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. • 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
Autumn 2	**Measurement: Money** **Number: Multiplication & Division**	• 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 • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
Spring 1	**Number: Multiplication & Division** **Statistics**	• Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts • 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

Spring 2	**Geometry: Properties of shape** **Number: Fractions**	• 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 • Recognise, find, name and write fractions $^1/_3$, $^1/_4$, $^2/_4$ and $^3/_4$ of a length, shape, set of objects or quantity • Write simple fractions e.g. $^1/_2$ of 6 = 3 and recognise the equivalence of $^2/_4$ and $^1/_2$.
Summer 1	**Measurement: Length & Height** **Geometry: Position & Direction** **Consolidation**	• Compare and order lengths and record the results using >, < and = • Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm)) to the nearest appropriate unit, using rulers • 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)
Summer 2	**Measurement: Time** **Measurement: Mass, Capacity & Temperature**	• 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 sequence intervals of time • Choose and use appropriate standard units to estimate and measure mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, scales, thermometers and measuring vessels • Compare and order mass, volume/capacity and record the results using >, < and

YEAR 3 & 4		
TERM	**UNIT OF STUDY**	**LEARNING/KEY SKILLS**

Autumn 1	**Number: Place Value**
	
	Number: Addition & Subtraction
		• Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
		• Count in multiples of 6, 7, 9, 25 and 1000
		• Count backwards through zero to include negative numbers
		• Identify, represent and estimate numbers using different representations
		• Read and write numbers up to 1000 in numerals and words
		• Read Roman numerals to 100 and know that over time, the numeral system changed to include the concept of zero and place value
		• Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones)
		• Order and compare numbers beyond 1000
		• Round any number to the nearest 10, 100 or 1000
		• Solve number and practical problems that involve all of the above and with increasingly large positive numbers
		• Add and subtract numbers mentally including:
		  ○ a three-digit number and ones
		  ○ a three-digit number and tens
		  ○ a three-digit number and hundreds
		• Add and subtract numbers with up to 4 digits using formal written methods of columnar addition and subtraction where appropriate
		• Estimate and use inverse operations to check answers to a calculation
		• Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Autumn 2	**Measurement: Length & Perimeter** **Number: Multiplication & Division**	• Measure, compare, add and subtract: lengths (m/cm/mm) • Convert between different units of measure • Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • Recall multiplication and division facts for multiplication tables up to 12 × 12

		• Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
Spring 1	**Number: Multiplication & Division** **Measurement: Area** **Number: Fractions**	• Recognise and use factor pairs and commutativity in mental calculations • Multiply two-digit and three-digit numbers by a one-digit number using formal written layout • Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. • Find the area of rectilinear shapes by counting squares • Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators • Recognise and show, using diagrams, families of common equivalent fractions • Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
Spring 2	**Number: Fractions & Decimals**	• Add and subtract fractions with the same denominator • Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number • Recognise and write decimal equivalents of any number of tenths or hundredths • Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
Summer 1	**Number: Fractions & Decimals** **Measurement: Money**	• Round decimals with one decimal place to the nearest whole number • Compare numbers with the same number of decimal places up to two decimal places • Recognise and write decimal equivalents for ¼, ½, ¾ • Solve simple measure and money problems involving fractions and decimals to two decimal places

	Measurement: Time	• Estimate, compare and calculate different measures, including money in pounds and pence • Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • Know the number of seconds in a minute and the number of days in each month, year and leap year • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days
Summer 2	**Measurement: Time** **Statistics** **Geometry: Properties of shape** **Geometry: Position & direction**	• Read, write and convert time between analogue and digital 12- and 24-hour clocks • Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs • Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs. • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • Recognise angles as a property of shape or a description of a turn • Identify acute and obtuse angles and compare and order angles up to two right angles by size • Identify lines of symmetry in 2-D shapes presented in different orientations • Complete a simple symmetric figure with respect to a specific line of symmetry. • Describe positions on a 2-D grid as coordinates in the first quadrant • Describe movements between positions as translations of a given unit to the left/right and up/down • Plot specified points and draw sides to complete a given polygon.

YEAR 5 & 6		
TERM	**UNIT OF STUDY**	**LEARNING/KEY SKILLS**
Autumn 1	**Number: Place Value** **Number: Addition & Subtraction** **Number: Multiplication & Division**	• Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • Use negative numbers in context, and calculate intervals across zero • Round any whole number to a required degree of accuracy • Solve number and practical problems that involve all of the above • Read Roman numerals to 1000 (M) and recognise years written in Roman numerals • Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • Use their knowledge of the order of operations to carry out calculations involving the four operations • Identify common factors, common multiples and prime numbers • 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 number using the formal written method of short division where appropriate, interpreting remainders according to the context • 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 • Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places • Multiply and divide numbers mentally drawing upon known facts
Autumn 2	**Number: Fractions**	• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination • Compare and order fractions, including fractions > 1 • Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6]

	Geometry: Position & Direction	• Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5] • Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams • Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ × ½ = 1/8] • 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
Spring 1	**Number: Decimals & Percentages**	• Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8] • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • Round decimals with two decimal places to the nearest whole number and to one decimal place • Read, write, order and compare numbers with up to three decimal places • Solve problems which require answers to be rounded to specified degrees of accuracy • Multiply one-digit numbers with up to two decimal places by whole numbers • Use written division methods in cases where the answer has up to two decimal places • Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal

	Number: Algebra	• Solve problems which require knowing percentage and decimal equivalents of ½ , ¼ , 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25 • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts • Use simple formulae • Generate and describe linear number sequence • Express missing number problems algebraically • Find pairs of numbers that satisfy an equation with two unknowns • Enumerate possibilities of combinations of two variables.
Spring 2	**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, using decimal notation to up to three decimal places • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • Convert between miles and kilometres • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Recognise that shapes with the same areas can have different perimeters and vice versa • Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes • Calculate the area of parallelograms and triangles • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3] • Recognise when it is possible to use formulae for area and volume of shapes • Solve problems involving converting between units of time • Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate

	Number: Ratio & 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
Summer 1	**Statistics** **Geometry: Properties of shape**	• Solve comparison, sum and difference problems using information presented in a line graph • Interpret and construct pie charts and line graphs and use these to solve problems • Calculate and interpret the mean as an average • Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • Draw given angles, and measure them in degrees (o) • Identify: • angles at a point and one whole turn (total 360o) • angles at a point on a straight line and ½ a turn (total 180o) • other multiples of 90o • Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • Use the properties of rectangles to deduce related facts and find missing lengths and angles • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in triangles, quadrilaterals, and regular polygons

Summer 2	**Consolidation of above objectives**	

ENRICHMENT OPPORTUNITIES

Cluster Maths Day- Year 6 (4 children) 22nd June
Weekly active maths activity

HOW TO SUPPORT YOUR CHILD'S LEARNING

Calculations policy- **Link to document on website**

EYFS/National Curriculum Vocabulary progression- **Link to document on website**

Please find below some useful websites:

- PurpleMash (Login to own account)- A variety of activities and games to help children
- Mathletics (Login to own account) - Children can access activities to practise skills they are learning in school
- https://www.topmarks.co.uk/maths-games/
- https://mathsframe.co.uk
- https://whiterosemaths.com/parent-resources