This progression map shows the concepts and small steps taught to pupils from EYFS to Year 6. Maths is mapped across each term and concepts revisited incorporating a spiral approach to ensure we broaden and deepen pupil's mathematical knowledge and they have the chance to use and apply new knowledge to a range of tasks including reasoning and problem solving. These activities are used during topics, with ideas from White Rose and NCETM, but also as stand alone focus solving skills lessons (see page 12). In brackets, after the concept, are the small steps taught for remembering and mastering.

The progression for Years 1 to 6 is taken from the White Rose (Version 3) scheme of work; however, teachers use a range of resources and activities to ensure quality first teaching and understanding of the small step. The mathematical concepts are shown in bold, followed by the small steps progression for the lesson sequence in italics, combining both remembering and mastering. Progression in the EYFS is developed from the Statutory Framework for the Early Years Foundation Stage and the NCETM Progression document to meet with the needs of our children and the philosophy of our Early Years curriculum.

Strands of Maths (see also Appendix 1)

Number - Place Value	Number - Calculations	Number - Fractions, Decimals and Percentages	Measure	Geometry	Statistics	Algebra	Ratio and Proportion

EYFS - NURSERY AND RECEPTION

Depending on entry points of individual children, the sequence of learning is as follows:

Nursery						
Number	• Perceptual subitising - recognising values		• Subitise objects up to 3 • Can physically partition several things into two groups and can recognise these groups can be recombined to make the same total • Solve real world maths problems with numbers up to 5		• Know that the quantity is the same however it is arranged • Can talk about the different numbers within a number • Know that a group of things changes in quantities when something is added or taken away	
Numerical Patterns	• Say number words in sequence (initially 5, then 10, and then extending to larger numbers) • Compare collections and begin to talk about which group has more • Explore numbers with concrete objects - grouping and sharing		• Count using 1:1 correspondence • Identify groups with the same number of things • Understand fair and unfair when objects are shared between them		• Know that the last number tells you how many are in the set • Use vocabulary more, less, fewer and same to compare quantities • Understand equal parts and whole shapes	
Shape, Space and Measure	• Recognising attributes (the stick is long) • Develop spatial awareness: experiencing different viewpoints	• With teacher support compares some types of measures • Talk about and copy patterns around them	• Copy and continue **ABAB** pattern • Develop spatial vocabulary to describe position and direction	• Shows awareness of comparison in estimating and predicting • Explore shapes and the attributes of shapes through play	• Create own **ABAB** patterns • Explore shapes and the attributes of shapes through play	• Compare some types of measures • Notice and correct an error in an **ABAB** pattern • Begin to show awareness of the properties of shapes, identifying similarities. Use informal and

						mathematical language to describe them

Reception	Autumn		Spring		Summer	
Number	• Counting • Recognising quantities (subitise perceptually to 5) • Comparing quantities • Ordering numbers • Exploring natural objects and quantities inside and outside at each stage	• Counting • Recognising numbers 1-5/10 (subitise conceptually from 5) • One more / fewer up to 5 / 10 • Comparing quantities • Identify 1 more / 1 less of numbers to 10 • Ordering numbers	• Conceptual subitising (part / whole) • Recognising numbers to 20 • 1 more / 1 less • Practical addition and subtraction with numbers to 10 • Number bonds to 5 • Ordering numbers (subitise to 10 using a range of concept images) • Unitising	• Part whole • Doubling, halving and sharing • Addition and subtraction • Subitise to 10	• Addition and subtraction • Number bonds to 10 recap • Counting in 2s, 5s and 10s	
Numerical Patterns						
Shape, Space and Measure	• 2D / 3D shapes and properties • Combine shapes to create new ones • Repeating patterns • Times of the day and language: morning, lunchtime, afternoon, evening, night, day, before, after, first, last, yesterday, tomorrow		• Repeating patterns • Relationships between shapes, compose, decompose, shapes within shapes • Measurement including non-standardised units of measure	• Record patterns • Use of spatial reasoning to create and solve problems • Introduction to time and money • Order objects and people by length, height • Capacity / weight	Secure previous knowledge through application before Year one. Address any gaps and consolidating language to ensure children are secure in their knowledge and skills.	

		• Compare objects and people by length, height • Capacity / weight		

Reception Reasoning and Problem Solving

Working systematically **Finding all possibilities** **Enumerating possibilities for combinations**	**Generalising and conjecturing** **Explaining and justifying** **Finding rules and describing patterns**	**Thinking strategically** **Interpreting information** **Solving logic problems**	**Reasoning, convincing and proof** **Considering general statements:** **"Convince yourself and convince your friend".**
Talk about things being in order. Identify the same and different. Use ordinal vocabulary, 1st 2nd etc. Sort objects using and explaining criteria. Explain what they are thinking and doing. Represent work with objects or pictures and discuss it, talk about ways to check that there are no omissions or repetitions.	Talk about, recognise and recreate simple patterns. Identify the same and different. Describe solutions to practical problems, drawing on experience, talking about their own ideas, methods and choices. Sort objects using criteria and explaining Make a prediction about the next part of the pattern.	Recognise similarities and differences. Sort objects using several criteria and sort to their own criteria, justifying their choices. Say why an item does not belong into a set. Guess the criteria being used to sort objects. Explain what they are thinking and doing.	Explain why an answer is correct for example: • when answering simple problems involving addition and subtraction in their play • why they have used particular shapes in junk modelling • why certain shapes fit into a jigsaw • explain how they work out doubles and halves using resources

Maths in KS1

	Autumn	Spring	Summer
Year 1	**Place Value within 10** - *(sort objects, count objects, count objects from a larger group, represent objects, recognise numbers as words, count on from any number, 1 more, count backwards, 1 less, compare groups by matching, fewer same more, less than greater than equal to, compare numbers, order objects and numbers, the number line)* **Addition and Subtraction within 10** - *(introduce parts and wholes, part-whole model, write number sentences, fact families - addition facts, number bonds within 10, systematic number bonds within 10, number bonds to 10, addition - add together, addition - add more, addition problems, find a part, subtraction - find a part, fact families - eight facts, subtraction - take away/cross out, subtraction - take away, subtraction on a number line, add or subtract 1 or 2)* **Geometry - Shape** - *(recognise and name 3-D shapes, sort 3-D shapes, recognise and name 2-D shapes, sort 2-D shapes, patterns with 2-D and 3-D shapes)*	**Place Value within 20** - *(count within 20, understand 10, understand 11 12 13, understand 14 15 16, understand 17 18 19, understand 20, 1 more and 1 less, number line to 20, use a number line to 20, estimate on a number line to 20, compare numbers to 20, order numbers to 20)* **Addition and Subtraction within 20** - *(add by counting on within 20, add ones using number bonds, find and make number bonds to 20, doubles, near doubles, subtract ones using number bonds, subtraction - counting back, subtraction - finding the difference, related facts, missing number problems)* **Place Value within 50** - *(count from 20-50, 20 30 40 and 50, count by making groups of 10, groups of tens and ones, partition into tens and ones, number line to 50, estimate on a number line to 50, 1 more and 1 less)* **Measure - Length and Height** - *(compare lengths and heights, measure length using objects, measure length using centimetres)* **Measure - Mass and Volume** - *(heavier and lighter, measure mass, compare mass, full and empty, compare volume, measure capacity, compare capacity)*	**Multiplication and Division** - *(count in 2s, count in 10s, count in 5s, recognise equal groups, add equal groups, make arrays, make doubles, make equal groups - grouping, make equal groups - sharing)* **Fractions** - *(recognise a half of an object or shape, find a half of an object or shape, recognise a half of a quantity, find a half of a quantity, recognise a quantity of an object or shape, find a quarter of an object or shape, recognise a quarter of a quantity, find a quarter of a quantity)* **Geometry - Position and Direction** - *(describe turns, describe position - left and right, describe position - forwards and backwards, describe position - above and below, ordinal numbers)* **Place Value within 100** - *(count from 50 to 100, tens to 100, partition into tens and ones, number line to 100, 1 more and 1 less, compare numbers with the same number of tens, compare any two numbers)* **Measure - Money** - *(unitising, recognise coins, recognise notes, count in coins)* **Measure - Time** - *(before and after, days of the week, months of the year, hours minutes and seconds, tell the time to the hour, tell the time to the half hour)*

Year 1 Reasoning and Problem Solving

Working systematically **Finding all possibilities** **Enumerating possibilities for combinations**	**Generalising and conjecturing** **Explaining and justifying** **Finding rules and describing patterns**	**Thinking strategically** **Interpreting information** **Solving logic problems**	**Reasoning, convincing and proof** **Considering general statements:** **"Convince yourself and convince your friend".**
Identify the same and different. Record different answers in a systematic way, identifying why this is important and explaining how they have done this. Explain how answers differ. Recognise that there is sometimes more than one possible answer to a problem. Give examples that match a given statement and those that don't. Talk about patterns in their lists / results.	Describe and recreate simple patterns involving numbers, shapes or items. Decide whether examples satisfy given conditions. Describe ways of solving puzzles and problems, explaining choices and decisions. Represent findings orally, using pictures or practically. Make a prediction about the next part of the pattern and explain why. Recognise a simple relationship. Make predictions and conjectures.	Use one piece of information and see what effect it has. Check that the answer meets all of the criteria. Solve a problem using given facts. Sort objects, number or shapes and explain why an example does or does not fit into a group.	Explain why an answer is correct for example: • showing how they know the multiples of two, five or ten using resources such as numicon or a number line or square • why an number sentence is correct or incorrect using known facts or resources, • why adding or subtracting zero has no effect, • how they know what half or quarter of a quantity object or shape is

	Autumn	Spring	Summer
Year 2	**Place Value within 100** - *(numbers to 20, count objects to 100 by making 10s, recognise tens and ones, use a place value chart, partition numbers to 100, write numbers to 100 in words, flexibly partition numbers to 100, write numbers to 100 in expanded form, 10s on a number line to 100, 10s and 1s on a number line to 100, estimate numbers on a number line, compare objects, compare numbers, order objects and numbers, count in 2s 5s 10s, count in 3s)* **Addition and Subtraction** - *(bonds to 10, fact families - addition and subtraction bonds within 20, related facts, bonds to 100 (tens), add and subtracts 1s, add by making 10, add three 1-digit numbers, add to the next 10, add across a 10, subtract across a 10, subtract from a 10, subtract a 1 digit number from a 2-digit number (across a 10), 10 more and 10 less, add and subtract 10s, add two 2-digit numbers (not across a 10), add two 2-digit numbers (across a 10), subtract two 2-digit numbers (not across a 10), subtract two 2-digit numbers (across a 10), mixed addition and subtraction, compare number sentences, missing number problems)* **Geometry - Shape** - *(recognise 2-D and 3-D shapes, count sides on 2-D shapes, count vertices on 2-D shapes, draw 2-D shapes, lines of symmetry on shapes, use lines of symmetry to complete shapes, sort 2-D shapes, count faces on 3-D shapes, count edges on 3-D shapes, count vertices on 3-D shapes, sort 3-D shapes, make patterns with 2-D and 3-D shapes)*	**Measure - Money** - *(count money - pence, count money - pounds (notes and coins), count money - pence and pounds, choose notes and coins, make the same amount, compare amounts of money, calculate with money, make a pound, find change, two-step problems)* **Multiplication and Division** - *(recognise equal groups, make equal groups, add equal groups, introduce the multiplication sign, multiplication sentences, use arrays, make equal groups - grouping, make equal groups - sharing, 2 times-table, divide by 2, doubling and halving, odd and even numbers, 10 times-table, divide by 10, 5 times-table, divide by 5, 5 and 10 times-tables)* **Measure - Length and Height** - *(measure in centimetres, measure in metres, compare lengths and heights, order lengths and heights, four operations with lengths and heights)* **Measure - Mass, Capacity and Temperature** - *(compare mass, measure in grams, measure in kilograms, four operations with mass, compare volume and capacity, measure in millimetres, measure in litres, four operations with volume and capacity, temperature)*	**Fractions** - *(introduction to part and whole, equal and unequal parts, recognise a half, find a half, recognise a quarter, find a quarter, recognise a third, find a third, find the whole, unit fractions, non-unit fractions, recognise the equivalence of a half and two quarters, recognise three-quarters, find three-quarters, count in fractions up to a whole)* **Measure - Time** - *(o'clock and half past, quarter past and quarter to, tell time past the hour, tell time to the hour, tell the time to 5 minutes, minutes in an hour, hours in a day)* **Statistics** - *(make tally charts, tables, block diagrams, draw pictograms (1-1), interpret pictograms (1-1), draw pictograms (2 5 and 10), interpret pictograms (2 5 and 10)* **Geometry - Position and Direction** - *(language of position, describe movement, describe turns, describe movement and turns, shape patterns with turns)*

Year 2 Reasoning and Problem Solving

Working systematically **Finding all possibilities** **Enumerating possibilities for combinations**	**Generalising and conjecturing** **Explaining and justifying** **Finding rules and describing patterns**	**Thinking strategically** **Interpreting information** **Solving logic problems**	**Reasoning, convincing and proof** **Considering general statements: "Convince yourself and convince your friend".**
Use a systematic way to solve a problem. Create a systematic list of possibilities. Talk about why it is a complete list and how they have been systematic. Look for patterns and possible general statements or relationships	Identify patterns and relationships involving numbers or shapes, and use these to solve problems. Talk about how a pattern will continue and make predictions. Talk about the pattern generally, discussing a general relationship or statement in words. Describe and explain methods, choices and solutions to puzzles and problems.	Solve a problem by identifying given facts and prioritising them. Identify necessary information for solving problems Confirm that they have found the correct solution by checking in another way. Use recording to help them make sense of the information given and to find missing information.	Explain why an answer is correct, for example: • use known facts or inverse operations or place value or resources such as dienes or numicon or a number line to show why a number sentence is correct or incorrect, • use resources to show how they know how to find a fraction of a quantity or shape or object and that 2/4 = ½ • how they have compared and ordered items by measuring • why different combinations of coins might have the same value • why times expressed in different ways may be the same • how they solved problems using pictograms, tallies or block diagrams

Maths in KS2

	Autumn	Spring	Summer
Year 3	**Place Value within 1,000** - *(represent numbers to 100, partition numbers to 100, number line to 100, hundreds, represent numbers to 1,000, partition numbers to 1,000, flexible partitioning of number to 1,000, hundreds tens and ones, find 1 10 or 100 more or less, number line to 1,000, estimate on a number line to 1,000, compare numbers to 1,000, order numbers to 1,000, count in 50s)* **Addition and Subtraction** - *(apply number bonds within 10, add and subtract 1s, add and subtract 10s, add and subtract 100s, spot the pattern, add 1s across a 10, add 10s across a 100, subtract 1s across a 10, subtract 10s across a 100, make connections, add two numbers (no exchange), subtract two numbers (no exchange), add two numbers (across a 10), add two numbers (across a 100), subtract two numbers (across a 10), subtract two numbers (across a 100), add 2-digit and 3-digit numbers, subtract a 2-digit number from a 3-digit number, complements to 100, estimate answers, inverse operations, make decisions)* **Multiplication and Division** - *(multiplication - equal groups, use arrays, multiples of 2, multiples of 5 and 10, sharing and grouping, multiply by 3, divide by 3, 3 times-table, multiply by 4, divide by 4, 4 times-table, multiply by 8, divide by 8, 8 times-table, 2 4 and 8 times-tables)*	**Multiplication and Division** - *(multiples of 10, related calculations, reasoning about multiplication, multiply a 2-digit number by a 1-digit number with no exchange, multiply a 2-digit number by a 1-digit number with exchange, link multiplication and division, divide a 2-digit number by a 1-digit number with no exchange, divide a 2-digit number by a 1-digit number with flexible partitioning, divide a 2-digit number by a 1-digit number with remainders, scaling, how many ways?)* **Measurement - Length and Perimeter** - *(measure in metres and centimetres, measure in millimetres, measure in centimetres and millimetres, metres centimetres and millimetres, equivalent lengths (metres and centimetres), equivalent lengths (centimetres and millimetres), compare lengths, add lengths, subtract lengths, what is perimeter?, measure perimeter, calculate perimeter)* **Fractions** - *(understand the denominators of unit fractions, compare and order unit fractions, understand the numerators of non-unit fractions, understand the whole, compare and order non-unit fractions, fractions and scales, fractions on a number line, count in fractions on a number line, equivalent fractions on a number line, equivalent fractions as bar models)* **Measurement - Mass and Capacity** - *(use scales, measure mass in grams, measure mass in kilograms and grams, equivalent mass (kilograms and grams), compare mass, add and subtract mass, measure capacity and volume in millilitres, measure capacity* and volume in litres and millilitres, equivalent capacities and volumes (litres and millilitres), compare capacity and volume, add and subtract capacity and volume)	**Fractions** - *(add fractions, subtract fractions, partition the whole, unit fractions of a set of objects, non-unit fractions of a set of objects, reasoning with fractions of an amount)* **Measurement - Money** - *(pounds and pence, convert pounds and pence, add money, subtract money, find change)* **Measurement - Time** - *(Roman numbers to 12, tell the time to 5 minutes, tell the time to the minute, read time on a digital clock, use a.m. and p.m., years months and days, days and hours, hours and minutes - use start and end times, hours and minutes - use durations, minutes and seconds, units of time, solve problems with time)* **Geometry - Shape** - *(turns and angles, right angles, compare angles, measure and draw accurately, horizontal and vertical lines, parallel and perpendicular lines, recognise and describe 2-D shapes, draw polygons, recognise and describe 3-D shapes, make 3-D shapes)* **Statistics** - *(interpret pictograms, draw pictograms, interpret bar charts, draw bar charts, collect and represent data, two-way tables)*

Year 3 Reasoning and Problem Solving

Working systematically **Finding all possibilities** **Enumerating possibilities for combinations**	**Generalising and conjecturing** **Explaining and justifying** **Finding rules and describing patterns**	**Thinking strategically** **Interpreting information** **Solving logic problems**	**Reasoning, convincing and proof** **Considering general statements: "Convince yourself and convince your friend".**
Prove that they have found all possible answers by being systematic. Use patterns to make predictions about the number of combinations. Use patterns to talk about general statements or relationships	Generate patterns by considering examples systematically in an investigation. Make predictions based on patterns in results in an investigation. Make general statements and discuss relationships using everyday language. Describe and explain methods, choices and solutions to puzzles and problems. Continue more complex patterns.	Solve a puzzle by identifying the facts and prioritising them. Use one piece of information in the problem and see what effect it has. Identify necessary information for solving problems. Check that their solution meets all the criteria.	Explain why an answer is correct, for example: • use known facts or inverse operations or place value or resources such as dienes or a number line to show why a number sentence is correct or incorrect, • Use resources such as dienes and place value counters to show how they used column methods for addition and subtraction, demonstrating that ten units is one ten and ten tens is one hundred • Use resources to show how they know what one tenth of a number is • Use resources or pictures to show how they know what a fraction of a number is and to show equivalent fractions • How they know what the perimeter of a shape is • Why times expressed in different ways may be the same • How they use conversions between metric units of measurements to solve problems (eg m,, cm, mm, kg, g, l ml) • Why a full turn is the same as four quarter turns etc • How they solved problems using bar charts, pictograms and tables

	Autumn	Spring	Summer
Year 4	**Place Value within 10,000** - *(represent numbers to 1,000, partition numbers to 1,000, number line to 1,000, thousands, represent numbers to 10,000, partition numbers to 10,000, flexible partitioning of number to 10,000, find 1 10 100 or 1,000 more or less, number line to 10,000, estimate on a number line to 10,000, compare numbers to 10,000, order numbers to 10,000, roman numerals, round to the nearest 10, round to the nearest 100, round to the nearest 1,000, round to the nearest 10 100 or 1,000)* **Addition and Subtraction** - *(add and subtract 1s 10s 100s and 1,000s, add up to two 4-digit numbers (no exchange), add two 4-digit numbers (one exchange), add two 4-digit numbers (more than one exchange), subtract two 4-digit numbers (no exchange), subtract two 4-digit numbers (one exchange), subtract two 4-digit numbers (more than one exchange), efficient subtraction, estimate answers, checking strategies)* **Measurement - Area** - *(what is area?, count squares, make shapes, compare areas)* **Multiplication and Division** - *(multiples of 3, multiply and divide by 6, 6 times-table and division facts, multiply and divide by 9, 9 times-table and division facts, 3 6 and 9 times-tables, multiply and divide by 7, 7 times-table and division facts, 11 times-table and division facts, 12 times-table and division facts, multiply by 1 and 0, divide a number by 1 and itself, multiply three numbers)*	**Multiplication and Division** - *(factor pairs, use factor pairs, multiply by 10, multiply by 100, divide by 10, divide by 100, related facts - multiplication and division, informal written method for multiplication, multiply a 2-digit number by a 1-digit number, multiply a 3-digit number by a 1-digit number, divide a 2-digit number by a 1-digit number, divide a 3-digit number by a 1-digit number, correspondence problems, efficient multiplication)* **Measurement - Length and Perimeter** - *(measure in kilometres and metres, equivalent lengths (kilometres and metres), perimeter on a grid, perimeter on a rectangle, perimeter of rectilinear shapes, find missing lengths in rectilinear shapes, calculate the perimeter of rectilinear shapes, perimeter of regular polygons, perimeter of polygons)* **Fractions** - *(understand the whole, count beyond 1, partition a mixed number, number lines with mixed numbers, compare and order mixed numbers, understand improper fractions, convert mixed numbers to improper fractions, convert improper fractions to mixed numbers, equivalent fractions on a number line, equivalent fraction families, add two or more fractions, add fractions and mixed numbers, subtract two fractions, subtract from whole amounts, subtract from mixed numbers)* **Decimals** - *(tenths as fractions, tenths as decimals, tenths on a place value chart, tenths on a number line, divide a 1-digit number by 10, divide a 2-digit number by 10, hundredths as fractions, hundredths as decimals, hundredths on a place value chart, divide a 1- or 2-digit number by 100)*	**Decimals** - *(make a whole with tenths, make a whole with hundredths, partition decimals, flexibly partition decimals, compare decimals, order decimals, round to the nearest whole number, halves and quarters as decimals)* **Measurement - Money** - *(Write money using decimals, convert between pounds and pence, compare amounts of money, estimate with money, calculate with money, solve problems with money)* **Measurement - Time** - *(years months weeks and days, hours minutes and seconds, convert between analogue and digital times, convert to the 24 hour clock, convert from the 24 hour clock)* **Geometry - Shape** - *(understand angles as turns, identify angles, compare and order angles, triangles, quadrilaterals, polygons, lines of symmetry, complete a symmetric figure)* **Statistics** - *(interpret charts, comparison sum and difference, interpret line graphs, draw line graphs)* **Geometry - Position and Direction** - *(describe position using coordinates, plot coordinates, draw 2-D shapes on a grid, translate on a grid, describe translation on a grid)*

Year 4 Reasoning and Problem Solving

Working systematically **Finding all possibilities** **Enumerating possibilities for combinations**	**Generalising and conjecturing** **Explaining and justifying** **Finding rules and describing patterns**	**Thinking strategically** **Interpreting information** **Solving logic problems**	**Reasoning, convincing and proof** **Considering general statements: "Convince yourself and convince your friend".**
Solve a problem by checking possible solutions against a given criteria. List possible answers in a systematic way efficiently. Justify the approach as being systematic. Prove that all items are listed Make a general statement and provide a convincing argument that it is true. Use a pattern to predict the next number of combinations	Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols. Use patterns to make predictions and general statements. Talk about the justification for the general statement. Describe and continue more complex patterns. Draw conclusions from investigations and explain their reasoning.	Solve a problem by identifying and prioritising given facts and information, checking possible solutions against given criteria. Identify necessary information for solving problems. Solve a problem by identifying and prioritising given facts and information.	Explain why an answer is correct, for example: • use known facts or inverse operations or place value or resources such as dienes or a number line to show why a number sentence is correct or incorrect • Use resources such as dienes and place value counters to show how they used column methods for addition and subtraction, • Explain how they solved word problems: choosing operations and disregarding unnecessary information and checking their answers • Explain what they know about multiplying by 0 and 1, and dividing by 1 • Use an array to explain how to find factors of a number, and how to multiply two or three digit number by a one digit number using the distributive law • Use resources or diagrams to show equivalent fractions and how to find a non unit fraction of a quantity or shape • how they use conversions between metric units of measurements to solve problems (eg km, m, hour, minute) • how they found the area of a shape • why analogue and digital, and 12 and 24 hour times might be the same

	Autumn	Spring	Summer
Year 5	**Place Value within 1,000,000** - *(roman numbers to 1,000, numbers to 10,000, numbers to 100,000, numbers to 1,000,000, read and write numbers to 1,000,000, powers of 10, 10 100 1,000 10,000 and 100,000 more or less, partition numbers to 1,000,000, number line to 1,000,000, compare and order numbers to 100,000, compare and order numbers to 1,000,000, round to the nearest 10 100 or 1,000, round within 100,000, round within 1,000,000)* **Addition and Subtraction** - *(mental strategies, add whole numbers with more than 4-digits, subtract whole numbers with more than 4-digits, round to check answers, inverse operations (addition and subtraction), multi-step addition and subtraction problems, compare calculations, find missing numbers)* **Multiplication and Division** - *(multiples, common multiples, factors, common factors, prime numbers, square numbers, cube numbers, multiply by 10 100 and 1,000, divide by 10 100 and 1,000, multiples of 10 100 and 1,000)* **Fractions** - *(find fractions equivalent to a unit fraction, find fractions equivalent to a non-unit fraction, recognise equivalent fractions, convert improper fractions to mixed numbers, convert mixed numbers to improper fractions, compare fractions less than 1, order fractions less than 1, compare and order fractions greater than 1, add and subtraction fractions with the same denominator, add fractions within 1, add fractions with total greater than 1, add to a mixed number, add two mixed numbers, subtract fractions, subtract from a mixed number, subtract from a mixed number - breaking the whole, subtract two mixed numbers)*	**Multiplication and Division** - *(multiply up to a 4-digit number by a 1-digit number, multiply a 2-digit number by a 2-digit number (area model), multiply a 2-digit number by a 2-digit number, multiply a 3-digit number by a 2-digit number, multiply a 4-digit number by a 2-digit number, solve problems with multiplication, short division, divide a 4-digit number by a 1-digit number, divide with remainders, efficient division, solve problems with multiplication and division)* **Fractions** - *(multiply a unit fraction by an integer, multiply a non-unit fraction by an integer, multiply a mixed number by an integer, calculate a fraction of a quantity, fraction of an amount, find the whole, use fractions as operators)* **Decimals and Percentages** - *(decimals up to 2 decimal places, equivalent fractions and decimals (tenths), equivalent fractions and decimals (hundredths), equivalent fractions and decimals, thousandths as fractions, thousandths as decimals, thousandths on a place value chart, order and compare decimals (same number of decimal places), order and compare decimals with up to 3 decimal places, round to the nearest whole number, round to 1 decimal place, understand percentages, percentages as fractions, percentages as decimals, equivalent fractions decimals and percentages)* **Measurement - Perimeter and Area** *(perimeter of rectangles, perimeter of rectilinear shapes, perimeter of polygons, area of rectangles, area of compound shapes, estimate area)* **Statistics** - *(draw line graphs, read and interpret line graphs, read and interpret tables, two-way tables, read and interpret timetables)*	**Geometry - Shape** - *(understand and use degrees, classify angles, estimate angles, measure angles up to 180, draw lines and angles accurately, calculate angles around a point, calculate angles on a straight line, lengths and angles in shapes, regular and irregular polygons, 3-D shapes)* **Geometry - Position and Direction** - *(read and plot coordinates, problem solving with coordinates, translation, translation with coordinates, lines of symmetry, reflection in horizontal and vertical lines)* **Decimals** - *(use known facts to add and subtract decimals within 1, complements to 1, add and subtract decimals across 1, add decimals with the same number of decimal places, subtract decimals with the same number of decimal places, add decimals with different numbers of decimal places, subtract decimals with different numbers of decimal places, efficient strategies for adding and subtracting decimals, decimal sequences, multiply by 10 100 and 1,000, divide by 10 100 and 1,000, multiply and divide decimals - missing values)* **Negative Numbers** - *(understand negative numbers, count through zero in 1s, count through zero in multiples, compare and order negative numbers, find the difference)* **Measurement - Converting Units** - *(kilograms and kilometres, millimetres and millilitres, convert units of length, convert between metric and imperial units, convert units of time, calculate with timetables)* **Measurement - Volume** - *(cubic centimetres, compare volume, estimate volume, estimate capacity)*

Year 5 Reasoning and Problem Solving

Working systematically **Finding all possibilities** **Enumerating possibilities for combinations**	**Generalising and conjecturing** **Explaining and justifying** **Finding rules and describing patterns**	**Thinking strategically** **Interpreting information** **Solving logic problems**	**Reasoning, convincing and proof** **Considering general statements: "Convince yourself and convince your friend".**
Find all possibilities by working systematically. Prove all possibilities are listed Recognise when reasoning is systematic and when it is not. Identify a pattern to make a prediction of the number of possibilities. Make a general statement and provide a convincing argument and apply this to other situations with similar or more combinations.	Generate patterns through systematic examples in an investigation. Identify and describe patterns using mathematical language. Accurately predict a later term in a pattern or sequence. Use a pattern to suggest and test general statements. Provide a convincing argument for the general statement. Draw conclusions from investigations and explain their reasoning using words, symbols or diagrams as appropriate	Use one piece of information in more complex problems and see what effect it has. Identify necessary information for solving problems. Check that the answer meets the criteria. Choose and use a recording system to organise the given information independently. Use appropriate language that is associated with this type of logic problem, e.g. 'If this … then this will change …'	Explain why an answer is correct, for example: • use known facts or inverse operations or place value or resources such as dienes or a number line to show why a number sentence is correct or incorrect • Use resources such as dienes and place value counters to show how they used column methods for addition and subtraction, • Use an array to show the distributive law and use this to explain their written methods for long multiplication • Explain how they solved word problems: choosing operations and disregarding unnecessary information and checking their answers • Explain common factors and multiples using an array, number line or resources • Prove whether a number is prime or not using an array or resources or known facts • Use resources or diagrams to show equivalent fractions and how to add and subtract fractions with denominators which are the same or multiples of the same number • how they use conversions between metric units and between metric and imperial units of measurements to solve problems • how they use facts about angles at a

			point or making a straight line to solve problems • how they solve problems using line graphs and tables

	Autumn	Spring	Summer
Year 6	**Place Value to 10,000,000** - *(numbers to 1,000,000, numbers to 10,000,000, read and write numbers to 10,000,000, powers of 10, number line to 10,000,000, compare and order any integers, round any integer, negative numbers)* **Addition, Subtraction, Multiplication and Division** - *(add and subtract integers, common factors, common multiples, rules of divisibility, primes to 100, square and cube numbers, multiply up to a 4-digit number by a 2-digit number, solve problems with multiplication, short division, division using factors, introduction to long division, long division with remainders, solve problems with division, solve multi-step problems, order of operations, mental calculations and estimations, reason from known facts)* **Fractions** - *(equivalent fractions and simplifying, equivalent fractions on a number line, compare and order (denominator), compare and order (numerator), add and subtract simple fractions, add and subtract any two fractions, add mixed numbers, subtract mixed numbers, multi-step problems)* **Fractions** - *(multiply fractions by integers, multiply fractions by fractions, divide a fraction by an integer, divide any fraction by an integer, mixed questions with fractions, fraction of an amount, fraction of an amount - find the whole)* **Measurement - Converting Units** - *(metric measures, convert metric measures, calculate with metric measures, miles and kilometres, imperial measures)*	**Ratio** - *(add or multiply?, use ratio language, introduction to the ratio system, ratio and fractions, scale drawing, use scale factors, similar shapes, ratio problems, proportion problems, recipes)* **Algebra** - *(1-step function machines, 2-step function machines, form expressions, substitution, formulae, form equations, solve 1-step equations, solve 2-step equations, find pairs of values, solve problems with two unknowns)* **Decimals** - *(place value within 1, place value - integers and decimals, round decimals, add and subtract decimals, multiply by 10 100 and 1,000, divide by 10 100 and 1,000, multiply decimals by integers, divide decimals by integers, multiply and divide decimals in context)* **Fractions, Decimals and Percentages** - *(decimal and fraction equivalents, fractions as division, understand percentages, fractions to percentages, equivalent fractions decimals and percentages, order fractions decimals and percentages, percentage of an amount - one step, percentage of an amount - multi-step, percentages - missing values)* **Measurement - Area, Perimeter and Volume** - *(shapes - same area, area and perimeter, area of a triangle - counting squares, area of a right-angled triangle, area of any triangle, area of a parallelogram, volume - counting cubes, volume of a cuboid)* **Statistics** - *(line graphs, dual bar charts, read and interpret pie charts, pie charts with percentages, draw pie charts, the mean)*	**Geometry - Shape** - *(measure and classify angles, calculate angles, vertically opposite angles, angles in a triangle, angles in a triangle - special cases, angles in a triangle - missing angles, angles in quadrilaterals, angles in polygons, circles, draw shapes accurately, nets of 3-D shapes)* **Geometry - Position and Direction** - *(the first quadrant, read and plot points in four quadrants, solve problems with coordinates, translations, reflections)* **Themed Projects, Consolidation and Problem Solving**

Year 6 Reasoning and Problem Solving

Working systematically **Finding all possibilities** **Enumerating possibilities for combinations**	**Generalising and conjecturing** **Explaining and justifying** **Finding rules and describing patterns**	**Thinking strategically** **Interpreting information** **Solving logic problems**	**Reasoning, convincing and proof** **Considering general statements: "Convince yourself and convince your friend".**
Identify a pattern to make a prediction of the number of possibilities. Make a general statement with a convincing argument and apply this to other situations with similar or more combinations. Express the general statement from an investigation using mathematical language, symbols and sometimes with algebra.	Construct and use a general statement in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence). Draw conclusions from investigations and explain their reasoning. Express the general statement from an investigation using mathematical language, symbols and sometimes with algebra.	Identify necessary information for solving problems. Prioritise and use given facts to solve and check complex logic problems. Ask 'What if . . . ?' questions. Recognise the effect of extensions such as 'What if …?' questions. Create their own criteria for solving a logic problem in the context of a solved problem. Refine and extend problems to generate fuller solutions	Explain why an answer is correct, using concise argument, involving symbols, mathematical language, graphs or diagrams. For example: • use known facts or inverse operations or place value to show why a number sentence is correct or incorrect • Use resources such as dienes and place value counters to show how they used column methods for addition and subtraction, • Use an array to show the distributive law and use this to explain long multiplication • Explain how they perform long and short division, using resources such as place value counters • Explain how they solved word problems: choosing operations and disregarding unnecessary information and checking their answers • Use resources or diagrams to show equivalent fractions and how to order, add, subtract and multiply fractions with different denominators and divide fractions by whole numbers • Explain how they solve ratio and proportion problems, perhaps using the bar method • Explain when they can use the formulae for area and volume of shapes • How to generate number sequences, and the rule for sequences they have generated

			• How they express missing number problems algebraically • How they use conversions between metric units (miles and km) and between metric and imperial units of measurements to solve problems • How they use facts about angles in a shape, at a point or vertically opposite to solve problems • How they solve problems using pie charts and line graphs, and calculate and interpret mean

Focus Problem Solving Skills

One of the main ways to help children become confident and competent problem solvers is by offering them plenty of opportunities to practise key problem-solving skills and, importantly, to talk about the skills in context.

We will be focusing on the following skills in these half terms:

- Autumn 1 - Working Systematically
- Autumn 2 - Trial and Improvement
- Spring 1 - Pattern Spotting
- Spring 2 - Working Backwards
- Summer 1 - Visualising / Logical Reasoning
- Summer 2 - Conjecturing, Generalising and Proving