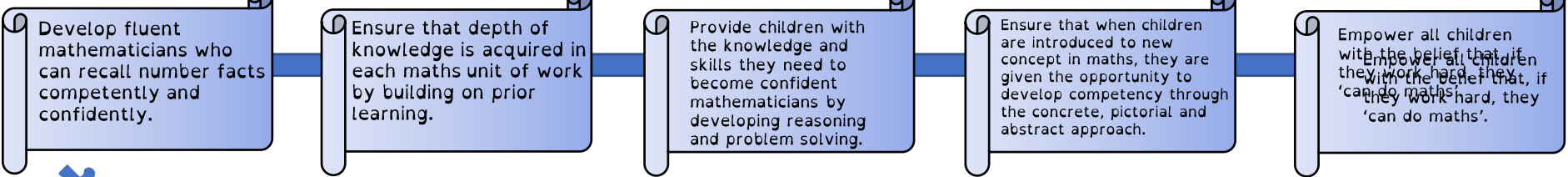At Berry Hill Primary School, we follow the mastery approach to teaching and learning in maths. We believe that, with the necessary scaffolding and by working hard, all children are capable of succeeding at maths.

Maths

"The only way to learn mathematics is to do mathematics"- Paul Halmos

🎯 Intent – We aim to...

- Develop fluent mathematicians who can recall number facts competently and confidently.
- Ensure that depth of knowledge is acquired in each maths unit of work by building on prior learning.
- Provide children with the knowledge and skills they need to become confident mathematicians by developing reasoning and problem solving.
- Ensure that when children are introduced to new concept in maths, they are given the opportunity to develop competency through the concrete, pictorial and abstract approach.
- Empower all children with the belief that if they work hard, they 'can do maths'.

🧩 Implementation – How do we achieve our aims?

How Maths is structured across Berry Hill

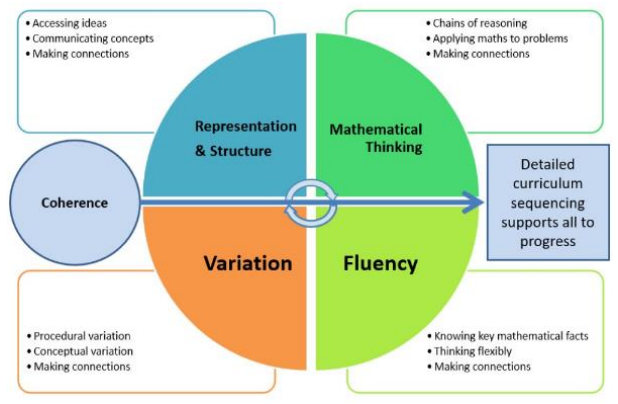|	Y1	Y2	Y3	Y4	Y5	Y6
PLACE VALUE	X	X	X	X	X	X
ADDITION AND SUBTRACTION	X	X	X	X	X	X
MULTIPLICATION AND DIVISION	X	X	X	X	X	X
FRACTIONS	X	X	X			
DECIMALS				X	X	X
FRACTIONS, DECIMALS, PERCENTAGES				X	X	X
RATIO AND PROPORTION						X
ALGEBRA						X
MEASUREMENT	X	X	X	X	X	X
GEOMETRY	X	X	X	X	X	X
STATISTICS		X	X	X	X	X

Mathematical Thinking

We aim to develop all three key areas of the National Curriculum in order to give the children the knowledge and skills they need to become confident mathematicians.

Fluency | Problem-Solving | Reasoning
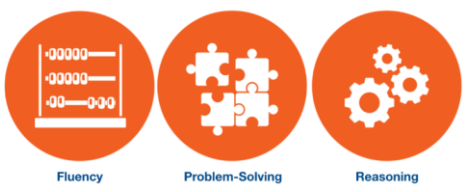
Mastery: The 5 Big Ideas

As Scientists, we will develop the following skills to support us in acquiring substantive knowledge:

- Representation & Structure
  - Accessing ideas
  - Communicating concepts
  - Making connections
- Mathematical Thinking
  - Chains of reasoning
  - Applying maths to problems
  - Making connections
- Coherence
- Variation
  - Procedural variation
  - Conceptual variation
  - Making connections
- Fluency
  - Knowing key mathematical facts
  - Thinking flexibly
  - Making connections
- Detailed curriculum sequencing supports all to progress

Concrete Pictorial Abstract :CPA:

When our children are introduced to a new concept in maths, they are given the opportunity to develop competency by following the CPA approach.

$$3 + 2 = 5$$

Concrete | Pictorial | Abstract

Concrete- children have the opportunity to work with physical objects (concrete resources), in order to bring the maths to life and to build an understanding of what they are doing.

Pictorial- children work with pictorial representations alongside concrete resources to enable them to make links. We encourage children to solve problems through visualising it.

Abstract- children develop their understanding of abstract methods with the support of concrete and pictorial representations.

Assessment

Flashback 4 activities are used daily to give the children opportunities to continue to revisit prior learning. They also provide teachers with the opportunity to assess retention of knowledge.

White Rose Maths end of block assessments are completed at the end of each unit in maths to check progress and identify gaps in knowledge and understanding.

NFER assessments are administered in Spring and Summer term in Years 1, 3, 4 and 5

SATs papers are administered in Spring and Summer term in Year 2 and 6

🎏 Impact – How will we know we have achieved our aims?

- Pupils are number fluent and confident when recalling key facts such as number bonds and times tables facts.
- Pupils can apply knowledge and skills learned in maths to solve problems.
- Pupils have a deep understanding of maths and are able to make connections across mathematical ideas.
- Pupils can apply their mathematical knowledge in other subjects such as Science.
- Pupils are confident and competent mathematicians who have the belief that they 'can do maths'.

The National Curriculum

Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools]. At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.
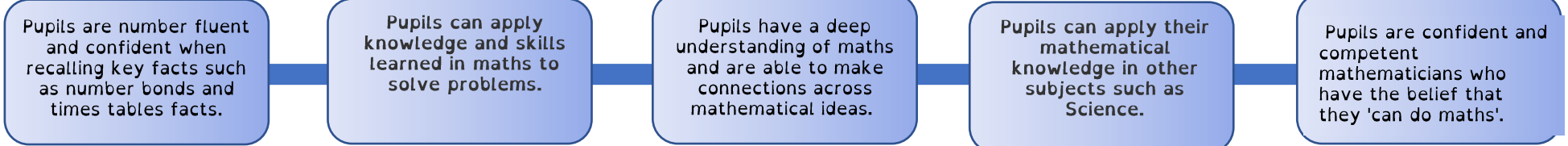
Lower Key Stage 2

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

Upper Key Stage 2

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly..

PLACE VALUE

SKILLS OF A MATHEMATICIAN

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
COUNTING	• Have a deep understanding of number to 10, including the composition of each number • Verbally count beyond 20, recognising the pattern of the counting system	• Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. • Count numbers to 100 in numerals; count in multiples of twos, fives and tens	• Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backwards.	• 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	• Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000 • Count forwards and backwards with positive and negative whole numbers, including through zero	
REPRESENT	• Subitise (recognise quantities without counting) up to 5	• Read and write numbers from 1 to 20 in numerals and words. • Read and write numbers to 100 in numerals • Identify and represent numbers using objects and pictorial representations	• Read and write numbers to at least 100 in numerals and words. • Identify, represent and estimate numbers using different representations, including the number line.	• Read and write numbers up to 1000 in numerals and in words. • Identify, represent and estimate numbers using different representations	• Identify, represent and estimate numbers using different representations • Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value	• Read, write (order and compare) numbers to at least 1,000,000 and determine the value of each digit. • Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	• Read, write (order and compare) numbers to at least 10,000,000 and determine the value of each digit.
USE PV & COMPARE	• Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity	• Given a number, identify one more and one less	• Recognise the place value of each digit in a two-digit number (tens and ones) • Compare and order numbers up to 100; use <, > and = signs	• Recognise the place value of each digit in a three-digit number (hundreds, tens and ones) • Compare and order numbers up to 1000	• Find 1000 more or less than a given number. • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) • Order and compare numbers beyond 1000	• (Read, write) order and compare numbers to at least 1,000,000 and determine the value of each digit	
PROBLEMS AND ROUNDING	5 and a bit?		• Use place value and number facts to solve problems.	• Solve number problems and practical problems involving these ideas.	• Solve number and practical problems that involve all of the above and with increasingly large positive numbers. • Round any number to the nearest 10, 100 or 1000.	• Solve number and practical problems that involve all of the above • Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000 • Interpret negative numbers in context	

ADDITION AND SUBTRACTION

SKILLS OF A MATHEMATICIAN

Disciplinary Skills

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
RECALL, REPRESENT, USE	• Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.	• Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs • Represent and use number bonds and related subtraction facts within 20.	• Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot. • 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.	• Estimate the answer to a calculation and use inverse operations to check answers.	• Estimate and use inverse operations to check answers to a calculation	• Use rounding to check answers to calculations and determine, in the context of the problem, levels of accuracy,	
CALCULATIONS	Verbal e.g. 5 and 2 is 7 or 5 needs 2 to make 7 (addition but not subtraction?) 5 is made of 2 and 3 using 10 frames/ rekenreks/ Hungarian dice frame	• Add and subtract one-digit and two-digit numbers to 20, including zero	• 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 • Add and subtract numbers with up to three-digits, using formal written methods of columnar addition and subtraction	• 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 four-digits, using formal written methods of columnar addition and subtraction where appropriate.	• Add and subtract numbers with up to four-digits, using formal written methods of columnar addition and subtraction where appropriate.	• Add and subtract numbers mentally with increasingly large numbers. • Add and subtract numbers with more than four-digits, using formal written methods (columnar addition and subtraction).	• Perform mental calculations, including with mixed operations and large numbers. • Use their knowledge of the order of operations to carry out calculations involving the four operations.
SOLVE PROBLEMS	1 more and 1 less	• Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? – 9	• 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.	• Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	• Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. • Solve problems, involving addition and subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.	• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

MULTIPLICATION AND DIVISION
SKILLS OF A MATHEMATICIAN

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
RECALL, REPRESENT, USE	• Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.		• 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.	• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables,	• Recall multiplication and division facts for multiplication tables up to 12x12 • Use place value, known and derived facts to multiply and divide mentally, including multiplying by 1 and 0; dividing by 1; multiplying together three numbers. • Recognise and use factor pairs and commutativity in mental calculations.	• Identify multiples and factors, including finding all factor pairs of a number and common factors of two numbers. • Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. • Establish whether a number up to 100 is prime and recall prime numbers up to 19 • Recognise and use square numbers and cube numbers , and the notation for squared (^{2}) and cubed (^{3})	• Identify common factors, common multiples and prime numbers • Use estimation to check answers to calculations, and determine, in the context of a problem, an appropriate degree of accuracy.
CALCULATIONS			• Calculate mathematical statements for multiplication and division withing the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) sign.	• Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.	• Multiply two-digit and three-digit numbers by one-digit numbers using formal written layout.	• Multiply numbers up to four digits by a one or two-digit number using a formal written method, including long multiplication for two-digit numbers. • Multiply and divide numbers mentally drawing upon known facts. • Divide numbers by up to four-digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. • Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	• Multiply multi-digit numbers up to four-digits by a two-digit whole number using the formal written method of long multiplication. • Perform mental calculations, including with mixed number operations and large numbers. • Divide numbers up to four-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 four-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.
SOLVE PROBLEMS	Sharing	• Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.	• Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	• Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	• 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.	• Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. • Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	• Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
COMBINED OPERATIONS						• Solve problems, involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.	• Use their knowledge of the order of operations to carry out calculations involving the four operations.

FRACTIONS

SKILLS OF A MATHEMATICIAN

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
RECOGNISE AND WRITE		• Recognise, find and name a half as one of two equal parts of an object, shape or quantity. • Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	• Recognise, find, name and write fractions 1/3, ¼, 2/4, and ¾ of a length, shape, set of objects or quantity.	• Recognise, find and write fractions of a discrete set of objects; unit fractions and non-unit fractions with small denominators. • Recognise and use fractions as numbers; unit fractions and non-unit fractions with small denominators. • 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.	• Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	• 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 (e.g. 2/5+ 4/5=6/5=1 1/5)	
COMPARE			• Recognise the equivalence of 2/4 and ½	• Recognise and show, using diagrams, equivalent fractions with small denominators. • Compare and order unit fractions and fractions with the same denominator.	• Recognise and show, using diagrams, families of common equivalent fractions.	• Compare and order fractions whose denominators are all multiples of the same number.	• Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • Compare and order fractions, including fractions > 1.
CALCULATIONS			• Write simple fractions e.g. ½ of 6 = 3	• Add and subtract fractions with the same denominator within 1 whole e.g. 5/7 + 1/7 = 6/7	• Add and subtract fractions with the same denominator.	• Add and subtract fractions with the same denominator and denominators that are multiples of the same number. • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	• 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 (e.g. ¼ x ½ = 1/8) • Divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6)
SOLVE PROBLEMS				• Solve problems that involve all of the above.	• 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.		

DECIMALS

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
RECOGNISE AND WRITE					• Recognise and write decimal equivalents of any number of tenths and hundredths. • Recognise and write decimal equivalents to ¼, ½, ¾	• Read and write decimal numbers as fractions (e.g. 0.71 = 71/100) • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.	• Identify the value of each digit in numbers given to three decimal places.
COMPARE					• 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.	• 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.	
CALCULATIONS AND PROBLEMS					• 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.	• Solve problems involving numbers up to three decimal places.	• Multiply and divide numbers by 10, 100 and 100 giving answers up to three decimal places. • Multiply one-digit numbers with up to two decimal places by whole numbers. • Solve problems which require answers to be rounded to specified degrees of accuracy.

FRACTIONS, DECIMALS AND PERCENTAGES

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
FRACTIONS, DECIMALS AND PERCENTAGES					• Solve simple measure and money problems involving fractions and decimals 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 a denominator 100, and as a decimal. • 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.	• Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375 for a simple fraction 3/8) • Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
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 (e.g. of measures and such as 15% of 360) and the use pf 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.

Note- although algebraic notation is not introduced until Year 6, algebraic thinking starts much earlier as exemplified by the 'missing number' objectives from Year 1, 2 and 3

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
ALGEBRA		• Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number operations such as 7 = ? - 9	• Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	• Solve problems, including missing number problems.			• Use simple formulae • Generate and describe linear number sequences • Express missing number problems algebraically • Find pairs of numbers that satisfy an unknown equation with two unknowns • Enumerate possibilities of combinations of two variables.

MEASUREMENT

		EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
USING MEASURES	Measuring using non-standard Weighing Capacity Ordering capacity		• Compare, describe and solve practical problems for: ➢ Lengths and heights (e.g. long/short, longer/shorter, tall/short, double/half) ➢ Mass/weight (e.g. heavy/light, heavier that/lighter than) ➢ Capacity and volume (e.g. full/empty, more than/less than, half full, quarter) ➢ Time (e.g. quicker/slower, earlier/later) • Measure and begin to record the following: ➢ Lengths and heights ➢ Mass/ weight ➢ Capacity and volume ➢ Time (hours, minutes, seconds)	• Compare and order lengths, mass, volume/capacity and record the results using <, > or -= • 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.	• Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/ capacity (l/ml)	• Estimate, compare and calculate different measures. • Convert between different units of measure (e.g. km to m; hour to minute)	• Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation, including scaling. • Covert between different units of metric measure (e.g. km and m; cm and m; cm and mm; g and kg; l and ml) • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.	• Solve problems involving the calculation and conversion of units and measure, using decimal notation up to three 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 up to three decimal places • Convert between miles and kilometres.
MONEY	Role play- using coins		• Recognise and know the value of different denominations of coins and notes.	• 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 involving giving change.	• Add and subtract amounts of money to give change using both £ and p in practical contexts.	• Estimate, compare and calculate different measures, including money in pounds and pence.	• Use all four operations to solve problems involving measure (e.g. money)	

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
TIME	Days of the week What day yesterday? What day tomorrow? Routines in the day- what do we do and when? Daytime and nighttime (light and dark) Start and end of the day time referred to.	• Sequence events in chronological order using language (e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening. • Recognise and use language relating to dates, including days of the week, weeks, months and years) • Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	• Compare and sequence intervals of time • Know the number of minutes in an hour and the number of hours in a day • 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.	• Compare durations of events (e.g. to calculate the time taken by a particular task • Know the number of seconds in a minute and the number of days in each month, year and leap year • Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12-hour and 24-hour clocks. • 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	• Read, write and covert time between analogue and digital 12- and 24-hour clocks • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days	• Solve problems involving converting between units of time	• Use, read, write and convert between standard units, converting measurements of time from a smaller unit of measure to a larger unit, and vice versa
PERIMETER, AREA, VOLUME				• Measure the perimeter of simple 2-D shapes	• Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • Find the area of rectilinear shapes by counting squares	• Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • 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 • Estimate volume (e.g. using 1cm³ blocks to build cuboids [including cubes]) and capacity (e.g. using water)	• Calculate the area of parallelograms and triangles • Recognise when it is possible to use formulae for area and volume of shaper • Recognise that shapes with the same area can have different perimeters and vice versa • 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 (e.g. mm³ and km³)

GEOMETRY

SKILLS OF A MATHEMATICIAN

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
2-D SHAPES	Name 2D shapes Build with Use for making patterns Everyday shapes in the environment (shape hunts) Tangrams- rotate and manipulate shapes. Shapes can be made within shapes	• Recognise and name common 2-D shapes (e.g. rectangles [including squares], circles and triangles)	• Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line • Compare and sort common 2-D shapes and everyday objects • Identify 2-D shapes on the surface of 3-D shapes (e.g. a circle on a cylinder and a triangle on a pyramid)	• Draw 2-D shapes	• Identify lines of symmetry in 2-D shapes presented in different orientations • Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	• Distinguish between regular and irregular polygons based on reasoning about equal sides and angles • Use the properties of rectangles to deduce related facts and find missing lengths and angles	• Draw 2-D shapes using given dimensions and angles • Compare and classify geometric shapes based on their properties and sizes • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the size of the radius
3-D SHAPES	Making models Naming properties Sorting Everyday objects	• Recognise and name common 3-D shapes (e.g. cuboids [including cubes], pyramids and spheres)	• Recognise and name common 3-D shapes (e.g. cuboids [including cubes], pyramids and spheres) • Compare and sort common 3-D shapes and everyday objects	• Make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them		• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations	• Recognise, describe and build simple 3-D shapes, including making nets

GEOMETRY

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
ANGLES AND LINES	Stand in a straight line			• Recognise angles as a property of a shape or a description of a turn • Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle. • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines	• 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 symmetric figure with respect to a specific line of symmetry	• Know angles are measures in degrees: estimate and compare acute, obtuse and reflex angles. • Draw given angles and measure them in degrees • Identify: ➢ Angles at a point and one whole turn (total 360°) ➢ angles at a point on a straight line and ½ a turn (total 180°) ➢ other multiples of 90°	• Recognise angles where they meet at a point are on a straight line, or are vertically opposite, and find missing angles • Find unknow angles in any triangles, quadrilaterals, and regular polygons.
POSITION AND DIRECTION	Where is the teddy bear? Moving in different directions. Forwards, backwards, left, right. Obstacle courses	• Describe position, direction and movement, including whole, half, quarter and three-quarter turns	• 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) • Order and arrange combinations of mathematical objects in patterns and sequences.		• 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	• Identify, describe and represent the position of a shape following a reflection or translation using the appropriate language and know that the shape has not changed.	• Describe positions on the full coordinates grid (all four quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axis

STATISTICS

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
PRESENT AND INTERPRET	Tally without the gate		• Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.	• Interpret and present data using bar charts, pictograms and tables.	• Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	• Complete, read and interpret information in tables, including timetables.	• Interpret and construct pie charts and line graphs and use them to solve problems.
SOLVE PROBLEMS			• 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.	• Solve one-step and two-step questions (for example 'How many more?' and 'How many fewer?') using information presented in scaled bar charts and pictograms and tables.	• Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	• Solve comparison, sum and difference problems using information presented in a line graph	• Calculate and interpret the mean as an average.

VOCABULARY PROGRESSION OF A MATHEMATICIAN

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
PLACE VALUE	Count Subitise Order/ ordinal Compare Forwards Backwards Numerals Digit One more One less Equal to More than Less (fewer) than	Sort Represent Multiples Partitioning Ones Tens	Count in steps Count in multiples Place value Estimate Compare	Ascending Descending 10 or 100 more 10 or 100 less Hundreds	Positive numbers Negative numbers Through zero Roman numerals 1000 more 1000 less Thousands Round To the nearest	Ten thousands One hundred thousands Powers of Integer	Millions Ten millions
ADDITION AND SUBTRACTION	Add Plus Altogether Total Take away/ minus Number bonds Part Whole digit	Addition/ add Subtraction Difference Equals Facts Problems Missing number inverse	Sum 2-digit number Commutative	Column addition Column subtraction Exchange Estimate	4-digit number Operations methods		
MULTIPLICATION AND DIVISION	Double Half Twice as many Equal Unequal Share Group Odd Even	Multiplication Division Arrays	Multiplication tables Commutative Repeated addition	Exchange Mathematical statements Missing number problems Integer scaling problems Correspondence problems Derived facts	Factor pairs Formal written layout Distributive law Remainders	Multiplies Factors Prime numbers Square numbers Cube numbers Short division Product Dividend Divisor Quotient Operations	Multi-digit numbers Long division
FRACTIONS, DECIMALS AND PERCENTAES		Whole Half Quarter Equal parts	Three quarters Third Equivalent fractions Unit fractions Non unit fractions Numerator Denominator One whole	Tenths	Decimal equivalence Hundredths Convert Proper fractions Improper fractions Decimal point	Fifth Thousandths Mixed numbers Per cent % Factors Integer Complements	
RATIO AND PROPORTION							Relative size Missing values Integer multiplication Percentages Scale factor Unequal sharing & grouping
ALGEBRA							Formulae Linear number sequences Algebraically Equation Unknowns Combinations Variables

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
MEASUREMENT (MEASURE AND LENGTH)	Measure Wide(er) Narrow(er) Compare Long(er)(est) Short(er)(est) Length	Compare	Standard units Estimate Order Record results Centimetre (cm) Metre (m)	Millimetre (mm) Perimeter	Kilometres (km) Rectilinear figure Area	Decimal notation Scaling Metric units Imperial units Inches Compound shape Irregular shapes Square centimetres Square metres	Conversion Miles Formulae Parallelograms Triangles feet
MEASUREMENT (HEIGHT, WEIGHT AND CAPACITY)	Height Long(er)/ short(er) Tall(er)/short(er) Weight Capacity Heavy/light Heavier than Lighter than Big/bigger/biggest Full/empty More than Less than Half/half full	Mass Volume	Kilogram (kg) Gram (g) Quarter full Three quarters full Litres (l) Millilitres (ml) Temperature Celsius			Cubic centimetre Pounds Pints	Cubic metre Cubic millimetre Cubic kilometre Gallons Stones Ounces
MEASUREMENT (TIME)	Time Quicker Slower Earlier Later Before After First Next Today Yesterday Tomorrow Morning Afternoon Evening Day Week Hour Minutes	Chronological order Days of the week Months of the year Month Year O'clock Half past Second	Intervals of time Quarter past/to Duration	Analogue clock Roman numerals 12-hour clock 24-hour clock a.m./p.m. Noon Midnight Leap year Digital	Convert		
MEASUREMENT (MONEY)		Money Coins Notes Pounds (£) Pence (p)	Value Change				

VOCABULARY PROGRESSION OF A MATHEMATICIAN

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
GEOMETRY (PROPERTIES OF SHAPES)	2-D shapes Rectangle Square Circle Triangle Characteristics 3-D shapes Cuboids Cubes Cones Spheres Curved Straight Flat	Sides Corners Properties Pyramids Faces	Pentagon Hexagon Line of symmetry Properties Cylinder Edges Vertices Vertex	Right-angle triangle Heptagon Octagon Polygon Properties Prism	Isosceles Equilateral Scalene Trapezium Rhombus Parallelogram Kite Geometric shapes Quadrilaterals	Regular polygon Irregular polygon	Radius Diameter Circumference Dimensions
GEOMETRY (ANGLES & LINES)				Orientattions Angles Acute angle Obtuse angle Right angle Greater than a right angle Less than a right angle Horizontal line Vertical line Perpendicular line Parallel line		Reflex angle Degrees Protractor One whole turn Angles on a straight line Angles around a point Vertically opposite Missing angles	
GEOMETRY (POSITION AND DIRECTION)	Over Under Between Around Through On Into Next to Behind Beneath Order Repeat Patterns On top of	Position Direction Movement Whole turn Quarter turn Half turn Three-quarter turn	Clockwise Anti-clockwise Straight line Rotation Arrange Sequences		Co-ordinates First quadrant Grid Translation Plot Polygon Axis	Reflection	Four quadrants Co-ordinate plane
STATISTICS			Pictograms Tally chart Block diagram Category Sorting Totalling Comparing Horizontal Vertical	Table Bar chart One-step problem Two-step problem	Time graph Discrete data Continuous date Line graph Comparison problem Sum problem Difference problem Calculate Interpret	Timetable Two-way table	Pie chart Mean

EYFS (MEASURE, SHAPE AND SPATIAL THINKING)

MATHEMATICS SEQUENCING

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Getting to Know You			Compare Size, Mass & Capacity Exploring Pattern			Circles and Triangles Positional Language			Shapes with 4 Sides. Time			Consolidation	
Spring	Compare Mass (2) Compare Capacity (2)			Length & Height Time			3d-shapes Patterns			Consolidation				
Summer	Spatial Reasoning (1) Match, Rotate, Manipulate			Spatial Reasoning (2) Compose and Decompose			Spatial Reasoning (3) Visualise and Build			Spatial Reasoning (4) Mapping				

EYFS MASTERING NUMBER

MATHEMATICS SEQUENCING

Term 1	Term 2	Term 3
Pupils will build on previous experiences of number from their home and nursery environments, and further develop their subitising and counting skills. They will explore the composition of numbers within 5. They will begin to compare sets of objects and use the language of comparison.	Pupils will continue to develop their subitising and counting skills and explore the composition of numbers within and beyond 5. They will begin to identify when two sets are equal or unequal and connect two equal groups to doubles. They will begin to connect quantities to numerals.	Pupils will consolidate their counting skills, counting to larger numbers and developing a wider range of counting strategies. They will secure knowledge of number facts through varied practice.
Pupils will: • identify when a set can be subitised and when counting is needed • subitise different arrangements, both unstructured and structured, including using the Hungarian number frame • make different arrangements of numbers within 5 and talk about what they can see, to develop their conceptual subitising skills • spot smaller numbers 'hiding' inside larger numbers • connect quantities and numbers to finger patterns and explore different ways of representing numbers on their fingers • hear and join in with the counting sequence, and connect this to the 'staircase' pattern of the counting numbers, seeing that each number is made of one more than the previous number • develop counting skills and knowledge, including: that the last number in the count tells us 'how many' (cardinality); to be accurate in counting, each thing must be counted once and once only and in any order; the need for 1:1 correspondence; understanding that anything can be counted, including actions and sounds • compare sets of objects by matching • begin to develop the language of 'whole' when talking	**Pupils will:** • continue to develop their subitising skills for numbers within and beyond 5, and increasingly connect quantities to numerals • begin to identify missing parts for numbers within 5 • explore the structure of the numbers 6 and 7 as '5 and a bit' and connect this to finger patterns and the Hungarian number frame • focus on equal and unequal groups when comparing numbers • understand that two equal groups can be called a 'double' and connect this to finger patterns • sort odd and even numbers according to their 'shape' • continue to develop their understanding of the counting sequence and link cardinality and ordinality through the 'staircase' pattern • order numbers and play track games • join in with verbal counts beyond 20, hearing the repeated pattern	**Pupils will:** • continue to develop their counting skills, counting larger sets as well as counting actions and sounds • explore a range of representations of numbers, including the 10-frame, and see how doubles can be arranged in a 10-frame • compare quantities and numbers, including sets of objects which have different attributes • continue to develop a sense of magnitude, e.g. knowing that 8 is quite a lot more than 2, but 4 is only a little bit more than 2 • begin to generalise about 'one more than' and 'one less than' numbers within 10 • continue to identify when sets can be subitised and when counting is necessary • develop conceptual subitising skills including when using a rekenrek

YEAR 1 — MATHEMATICS SEQUENCING

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value (within 10)**					Number **Addition and subtraction (within 10)**					Geometry Shape	Consolidation
Spring	Number **Place value (within 20)**			Number **Addition and subtraction (within 20)**			Number **Place value (within 50)**		Measurement **Length and height**		Measurement **Mass and volume**	
Summer	Number **Multiplication and division**			Number **Fractions**		Geometry **Position and direction**	Number **Place value (within 100)**		Measurement **Money**	Measurement **Time**		Consolidation

Term 1	Term 2	Term 3
Pupils will have an opportunity to consolidate the Early Learning Goals and continue to explore the composition of numbers within 10, and the position of these numbers in the linear number system.	Pupils will continue to explore the composition of numbers within 10 and explore addition and subtraction structures and the related language (without the use of symbols).	Pupils will explore the composition of numbers within 20 and their position in the linear number system. They will connect addition and subtraction expressions and equations to 'number stories').
Pupils will: • subitise within 5, including when using a rekenrek, and re-cap the composition of 5 • develop their understanding of the numbers 6 to 9 using the '5 and a bit' structure • compare numbers within 10 and use precise mathematical language when doing so • re-cap the order of numbers within 10 and connect this to '1 more' and '1 less' than a given number • explore the structure of even numbers (including that even numbers can be composed by doubling any number, and can be composed of 2s) • explore the structure of the odd numbers as being composed of 2s and 1 more • explore the composition of each of the numbers 6, 8, and 10 • explore number tracks and number lines and identify the differences between them	**Pupils will:** • explore the composition of each of the numbers 7 and 9 • explore the composition of odd and even numbers, seeing that even numbers can be made of two odd or two even parts, and that odd numbers can be composed of one odd part and one even part • identify the number that is two more or two less than a given odd or even number, identifying that two more/ less than an odd number is the next/ previous odd number, and two more/ less than an even number is the next/ previous even number • explore the aggregation and partitioning structures of addition and subtraction through systematically partitioning and re-combining numbers within 10 and connecting this to the part-part-whole diagram, including using the language of parts and wholes • explore the augmentation and reduction structures of addition and reduction using number stories, including introducing the 'first, then, now' language structure	**Pupils will:** • explore the composition of the numbers 11 to 19 as '10 and a bit' and compare numbers within 20 • connect the composition of the numbers 11 to 19 to their position in the linear number system, including identifying the midpoints of 5, 10 and 15 • compare numbers within 20 • understand how addition and subtraction equations can represent previously explored structures of addition and subtraction (aggregation/ partitioning/ augmentation/ reduction) • practise retrieving previously taught facts and reason about these

YEAR 2 — MATHEMATICS SEQUENCING

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**				Number **Addition and subtraction**					Geometry **Shape**		
Spring	Measurement **Money**		Number **Multiplication and division**					Measurement **Length and height**		Measurement **Mass, capacity and temperature**		
Summer	Number **Fractions**			Measurement **Time**			**Statistics**		Geometry **Position and direction**		Consolidation	

YEAR 2 MASTERING NUMBER

MATHEMATICS SEQUENCING

Term 1	Term 2	Term 3
Pupils will have an opportunity to consolidate their understanding and recall of number bonds within 10; they will re-cap the composition of the numbers 11 to 20 and reason about their position within the linear number system.	Pupils will have an opportunity to use their knowledge of the composition of numbers within 10 to calculate within 20; they will explore the links between the numbers in the linear number system within 10 to numbers within 100, focusing on multiples of 10 and the midpoint of 50.	Pupils will have further opportunities to use their knowledge of the composition of numbers within 10 to calculate within 20 and to reason about equations and inequalities.
Pupils will: • review the composition of the numbers 6 to 9 as '5 and a bit' • compare numbers using the language of comparison and use the symbols < > = • review the structure of even numbers (including exploring how even numbers can be composed of two odd parts or two even parts) and the composition of each of 6, 8 and 10 • review the structure of odd numbers (including exploring how odd numbers can be composed of one odd part and one even part) and the • consolidate their understanding of the numbers 10 and 20 as '10 and a bit' • consolidate their understanding of the linear number system to 20 and reason about midpoints	**Pupils will:** • explore how the numbers 6 to 9 can be doubled using the '5 and a bit' and '10 and a bit' structure • use doubles to calculate near doubles • use bonds of 10 to reason about bonds of 20, in which the given addend is greater than 10 • use known number bonds within 10 to calculate within 20, working within the 10-boundary • use their knowledge of bonds of 10 to find three addends that sum to 10 • use their knowledge of the composition of numbers within 20 to add and subtract across the 10-boundary • use their understanding of the linear number system to 10 to position multiples of 10 on a 0 - 100 number line and reason about midpoints	**Pupils will:** • continue to explore a range of strategies to subtract across the 10-boundary • review bonds of 20 in which the given addend is greater than 10, and reason about bonds of 20, in which the given addend is less than 10 • practise previously explored strategies to support their reasoning about inequalities and equations • review doubles and near doubles and transform additions in which two addends are adjacent odd/ even numbers into doubles • consolidate previously taught facts and strategies through continued, varied practice

YEAR 3 — MATHEMATICS SEQUENCING

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**			Number **Addition and subtraction**					Number **Multiplication and division A**			
Spring	Number **Multiplication and division B**			Measurement **Length and perimeter**			Number **Fractions A**			Measurement **Mass and capacity**		
Summer	Number **Fractions B**		Measurement **Money**		Measurement **Time**			Geometry **Shape**			Statistics	Consolidation

YEAR 4 — MATHEMATICS SEQUENCING

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**				Number **Addition and subtraction**			Measurement **Area**	Number **Multiplication and division A**			Consolidation
Spring	Number **Multiplication and division B**			Measurement **Length and perimeter**	Number **Fractions**					Number **Decimals A**		
Summer	Number **Decimals B**		Measurement **Money**		Measurement **Time**		Consolidation		Geometry **Shape**		Statistics	Geometry **Position and direction**

YEAR 5
MATHEMATICS SEQUENCING

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**			Number **Addition and subtraction**		Number **Multiplication and division A**			Number **Fractions A**			
Spring	Number **Multiplication and division B**			Number **Fractions B**		Number **Decimals and percentages**			Measurement **Perimeter and area**		**Statistics**	
Summer	Geometry **Shape**			Geometry **Position and direction**		Number **Decimals**			Number **Negative numbers**	Measurement **Converting units**		Measurement **Volume**

YEAR 6

MATHEMATICS SEQUENCING

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**		Number **Addition, subtraction, multiplication and division**					Number **Fractions A**		Number **Fractions B**		Measurement **Converting units**
Spring	**Ratio**		**Algebra**		Number **Decimals**		Number **Fractions, decimals and percentages**		Measurement **Area, perimeter and volume**		**Statistics**	
Summer	Geometry **Shape**		Geometry **Position and direction**	**Themed projects, consolidation and problem solving**								