

WPA Maths Overview

Maths is an extremely important subject area in life both inside and outside of the classroom. We invest a lot of time in Mathematics and set Maths learning in high esteem from Nursery up to Year 6.

Our Intent:

The intent of our Mathematics curriculum is to provide children with a foundation for understanding number, reasoning, thinking logically and problem solving with resilience so that they are fully prepared for the future. It is essential that these keystones of Mathematics are embedded throughout all strands of the National Curriculum. By adopting a Mastery approach, it is also intended that all children, regardless of their starting point, will maximise their academic achievement and leave WPA with enthusiasm and security in Maths, resulting in a lifelong positive relationship with number. We ensure that we deliver a high quality maths curriculum that is both challenging and enjoyable. We want children to make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. We intend for our pupils to be able to apply their mathematical knowledge within other subjects and areas.

Implementation

At Wantage Primary Academy, we teach Maths through a CPA approach (concrete, pictorial, abstract). The Concrete Pictorial Abstract (CPA) approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics. Pupils are introduced to a new mathematical concept through the use of **concrete** resources (e.g. fruit, Dienes blocks etc). When they are comfortable solving problems with physical aids, they are given problems with pictures – usually **pictorial representations** of the concrete objects they were using. Then they are asked to solve problems where they only have the **abstract** i.e. numbers or other symbols. Building these steps across a lesson can help pupils better understand the relationship between numbers and the real world, and therefore helps secure their understanding of the mathematical concept they are learning.

In KS1 and KS2, discrete Maths sessions are taught daily for 60-70 minutes each day. During these sessions, all children receive high-quality whole class teaching and are provided with ample opportunity to share their ideas, results and recordings with each other. We aim to give our children a solid grounding before moving onto more complicated mathematical concepts, giving them the confidence to build on skills already gained. We use Maths for Mastery model by the White Rose Maths Hub, ensuring children gain an in-depth understanding of Maths by teaching fluency, reasoning and problem solving in each lesson. Children use the unique star challenge to guide their learning and ensure the lid is lifted for all learners, including those with SEND needs and more able pupils. All children, regardless of their starting points are expected to answer fluency – reasoning and problem solving questions within a Maths session. We also teach quick fire 10 minute fluency sessions per week, which focus on areas of fluency that are imperative to making good progress such as number bonds, times tables and shape facts. We use the Maths overviews and small steps to support planning and teaching: <https://whiterosemaths.com/resources/primary>

Early Years implementation

Children in Nursery and Reception are taught Maths in daily whole class sessions and follow up tasks using the objectives and guidance from the Early Years Foundation Stage framework. The teaching of Maths in the EYFS involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, subitising, calculating simple addition and subtraction problems; and to describe shapes, spaces, patterns and measures.

Children develop their understanding through planned, purposeful play and through a mix of adult-led and child-initiated activity. In Nursery, we use Ten Town to build up the children's 'Numberness' i.e. teaching the threeness of three, the fourness of four and so on. Children are taught songs and rhymes to help them to recognize and form numbers. Whole class Nursery Maths focused Maths sessions are guided by White Rose Maths and guided group work and independent tasks continue the learning daily. There are opportunities to undertake Maths activities within continuous provision and outdoor play and enhancements linked to the current learning. Pupils who grasp concepts rapidly are challenged through having access to a wider variety of problems, whilst those children who are not sufficiently fluent in their understanding will be given opportunities to further develop their understanding before moving on, working on small focus tasks with an adult.

In Reception, whole class sessions are planned for daily using White Rose Maths guidance. In Reception we assess the children's understanding regularly and they are questioned within their learning to ensure challenge is correctly pitched. Following a whole class teaching session, children will then have a follow up task which involves: working with the teacher, independent learning, extended provision opportunities and continuous play opportunities. All children are expected to carry out Maths learning daily. Where children do not grasp a concept, interventions and gap-filling tasks are offered the same day to ensure children make progress. We employ in a 'keep up, not catch up' approach.

The Impact:

Through the implementation of a progressive Maths curriculum, our children are showing that they are gaining a broader understanding of Mathematical concepts, developing their critical thinking and becoming independent learners. Maths at WPA provides children with a deeper understanding of the subject and enables them to make connections and fluently apply mathematical skills and strategies to a range of situations and problems. This ensures children fully understand what they are learning and when and why strategies can be used in the real world. Progression of skills documents enable staff to have a clear vision of what children have previously been taught and what their next steps will be in their learning. Our children are immersed in memorable Maths lessons which improves metacognition and are exposed to rich mathematical vocabulary developing their reasoning and problem-solving skills. As a result, children speak incredibly highly and confidently about Maths and achieve highly in year. The impact of what we desire to achieve at WPA is evident throughout children's enjoyment of mathematics and their abilities, confidence and progress. We can also see that 87% of Reception achieved maths ARE and 88% of KS1 (July 2022) – which was also moderated externally

White Rose Maths is an organisation which provides maths resources and Schemes of Learning for pupils of all ages, from early years to secondary school. The Schemes of Learning (SOL) outline yearly frameworks that break down what children need to learn during each week of each term to master the learning objectives laid out by the National Curriculum. Our planning, teaching and independent tasks align with the White Rose Maths frameworks and are designed to be engaging and consistent, to help pupils develop a love of learning and understanding of concepts. At the heart of their resources and frameworks is the motto "Everyone Can Do Maths: Everyone Can!" — a slogan that we wholeheartedly agree with!

Their mission is to support teachers and parents all over the UK in helping children work towards maths mastery and change attitudes towards this subject, encouraging a growth mindset in teachers and learners. The philosophy behind White Rose Maths also focuses on making maths make sense for children and helping them to find enjoyment in number problems. We know that when children are engaged in learning and enjoying maths, that's when lessons really sink in and deep learning happens.

Pupils are not considered 'low ability' or allowed to feel like they 'can't do maths'. Instead, a positive 'can-do' attitude is encouraged and children are taught to enjoy working with numbers. The White Rose Maths yearly frameworks outline which topics to cover. By revisiting topics, we encourage fluency, the whole class progress at a similar pace, closing the attainment gap. <https://whiterosemaths.com/resources/primary>

Our Maths teaching encourages independence and the learning environments are designed to support this. This includes Maths working walls, a selection of resources, Maths organisers and Sentence stems (Appendices 1-3).

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	Recite numbers in order using a range of number songs Find numbers, shapes and quantities in the environment and use these during play	Recite numbers to 10 orally Begin to count objects Use the language of every day shapes- big/small/tall Begin to learn names of shapes	Begin to recognise numbers 1-5 Construct structures using a variety of different shapes, investigating which shapes work and which did not work	Recognise numbers 1-5 confidently and begin to match objects to quantity. Similarities and differences in shapes in the natural world	Recognise numbers 6-10 To be secure in numbers 1-5 Recognise a circle, square, triangle, rectangle confidently	Recognise numbers 1-10 and match quantity of objects.
Reception	Singing number rhymes, reading counting stories Identifying numbers of personal significance Recognising & naming numerals to 5 then 10 Counting sets 1-5, then 1-10 accurately Subitising orally Matching sets to numerals 1-5, then 1-10	Ordering/finding missing numerals 1-10 on a number line Saying number that is 1 more/1 less to 10 Comparing groups of objects: more or less Identify common shapes and properties. Using 2D&3D shapes to make pictures and patterns Using language of shape, size & measures in their play Writing numerals to 5 with correct formation	Oral counting beyond 10/counting backwards, introducing numerals & number names from 11 – 20 Ordering & finding missing numerals 1-20 on a number line Part whole models within 5 and then 10. Adding & subtracting in practical activities	Understanding doubles and halves Oral counting on/back from any number (to 20) Naming & describing properties of 2D & 3D shapes Comparing items by size/capacity/weight Describing position & direction Writing numerals to 10 then 20 with correct formation	Solving problems using addition & subtraction Saying number that is 1 more/1 less to 20 Understanding halving/sharing in practical contexts Counting on/back to add/take away Number bonds to 10 Formal strategies for layout in addition and subtraction $6 + _ = 10$ $10 - 7 = _$	Using correct language to talk about the shape, size, weight, capacity, position, time & distance of familiar objects Part whole models within 20 Addition and subtraction using formal methods and checking mentally Ordinal numbers Numbers bonds to 10 and 20
Year 1	Place Value to 30 Place value to 50 Addition and subtraction to 20 including money	Addition and subtraction. Numbers within 20 (including recognizing money) Money	Multiplication – 2s, 5s, 10s. Equal and unequal groups, arrays, repeated addition, multiplication, doubling and halving Shape	Measurement – length and height Measurement – mass, volume and capacity	Place value to 100 Fractions Position and direction	Time Four operations Consolidation
Year 2	Place Value to 100 Addition and subtraction.	Addition and subtraction including balancing equations Money	Multiplication and Division Shape	Measurement – length and height, mass, capacity, volume and temperature. Time	Fractions Consolidation and problem solving	Position and direction Statistics Consolidation – place value, all four operations

Year 3	Place Value up to 1000 Addition and Subtraction	Addition and Subtraction Multiplication and Division	Multiplication and Division Revisit fractions – fraction of shape and number	Fractions of amounts, unit and non-unit fractions Money Statistics	Fractions Properties of shape Measurement time	Measurement: length, perimeter, mass, capacity Consolidation of number and calculation
Year 4	Place value up to 10,000 Addition and subtraction	Length and Perimeter (introduce idea of area is too) Multiplication and Division	Multiplication and Division Area Fractions	Fractions Decimals	Decimals Money Time	Statistics Properties of shape Position and direction Consolidation
Year 5	Place value up to 100,000 Addition and subtraction	Multiplication and Division Perimeter and area	Multiplication and Division Fractions	Fractions Decimals and percentages	Statistics Shape Position and direction	Negative numbers Conversion Place value to 1000000 Consolidation
Year 6	Place value up to 10,000,000 Addition and subtraction	Multiplication and Division Fractions Converting units	Decimals Percentages Algebra	Fractions, decimals and percentages Area, perimeter, volume	Ratio Shape Position and direction	Consolidation

Key Learning in Mathematics – Reception

Number – number and place value	Number – addition and subtraction	Number – multiplication and division
<ul style="list-style-type: none"> I can count forwards to 20, beginning from 0 I can order numbers from 0 to 20 I can recognise which number is one more/less for numbers 0 to 20 	<ul style="list-style-type: none"> Using quantities and objects, I can add and subtract two 1-digit numbers by counting on and back to find the answer 	<ul style="list-style-type: none"> I can solve problems involving doubling and halving using sharing
	Measurement	
<ul style="list-style-type: none"> I can recognise one half of an object or shape 	Geometry – properties of shapes <ul style="list-style-type: none"> I can recognise, create and describe patterns I can explore characteristics of everyday objects and shapes and use mathematical language to describe them Geometry – position and direction <ul style="list-style-type: none"> I can use everyday language to talk about position Statistics	<ul style="list-style-type: none"> I can use everyday language to talk about size, weight, capacity, distance time and money to compare quantities and to solve problems

Key Learning in Mathematics – Year 1

Number – number and place value	Number – addition and subtraction	Number – multiplication and division
<ul style="list-style-type: none"> Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number Count in multiples of twos, fives and tens Read and write numbers to 100 in numerals Read and write numbers from 1 to 20 in numerals and words <i>Begin to recognise the place value of numbers beyond 20 (tens and ones)</i> Identify and represent numbers using objects and pictorial representations including the number line Use the language of: equal to, more than, less than (fewer), most, least Given a number, identify one more and one less <i>Recognise and create repeating patterns with numbers, objects and shapes</i> <i>Identify odd and even numbers linked to counting in twos from 0 and 1</i> <i>Solve problems and practical problems involving all of the above</i> 	<ul style="list-style-type: none"> Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs Represent and use number bonds and related subtraction facts within 20 Add and subtract one-digit and two-digit numbers to 20, including zero (<i>using concrete objects and pictorial representations</i>) Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$ 	<ul style="list-style-type: none"> <i>Recall and use doubles of all numbers to 10 and corresponding halves</i> 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
Number – fractions	Geometry – properties of shapes	Measurement
<ul style="list-style-type: none"> <i>Understand that a fraction can describe part of a whole</i> <i>Understand that a unit fraction represents one equal part of a whole</i> Recognise, find and name a half as one of two equal parts of an object shape or quantity (<i>including measure</i>) Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity (<i>including measure</i>) 	<ul style="list-style-type: none"> Recognise and name common 2-D shapes, including rectangles (including squares), circles and triangles Recognise and name common 3-D shapes, including cuboids (including cubes), pyramids and spheres 	<ul style="list-style-type: none"> Measure and begin to record: <ul style="list-style-type: none"> lengths and heights, <i>using non-standard and then manageable standard units (m/cm)</i> mass/weight, <i>using non-standard and then manageable standard units (kg/g)</i> capacity and volume <i>using non-standard and then manageable standard units (litres/ml)</i> time (hours/minutes/seconds) <i>within children’s range of counting competence</i> Compare, describe and solve practical problems for: <ul style="list-style-type: none"> lengths and heights (for example, long/short, longer/shorter, tall/short, double/half) mass/weight (for example, heavy/light, heavier than, lighter than) capacity and volume (for example, full/empty, more than, less than, half, half full, quarter) time (for example, quicker, slower, earlier, later) Recognise and use language relating to dates, including days of the week, weeks, months and years Sequence events in chronological order using language (for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening) Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times Recognise and know the value of different denominations of coins and notes
	Geometry – position and direction	
	<ul style="list-style-type: none"> Describe movement, including whole, half, quarter and three-quarter turns <i>Recognise and create repeating patterns with objects and shapes</i> Describe position and direction 	
	Statistics	
	<ul style="list-style-type: none"> <i>Sort objects, numbers and shapes to a given criterion and their own</i> <i>Present and interpret data in block diagrams using practical equipment</i> <i>Ask and answer simple questions by counting the number of objects in each category</i> <i>Ask and answer questions by comparing categorical data</i> 	

Key Learning in Mathematics – Year 2

Number – number and place value	Number – addition and subtraction	Number – multiplication and division
<ul style="list-style-type: none"> Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward Read and write numbers to at least 100 in numerals and in words Recognise the place value of each digit in a two-digit number (tens, ones) Identify, represent and estimate numbers using different representations, including the number line Partition numbers in different ways (e.g. $23 = 20 + 3$ and $23 = 10 + 13$) Compare and order numbers from 0 up to 100; use $<$, $>$ and $=$ signs Find 1 or 10 more or less than a given number Round numbers to at least 100 to the nearest 10 Understand the connection between the 10 multiplication table and place value Describe and extend simple sequences involving counting on or back in different steps Use place value and number facts to solve problems 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting) Select a mental strategy appropriate for the numbers involved in the calculation Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot Understand subtraction as take away and difference (how many more, how many less/fewer) Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Recall and use number bonds for multiples of 5 totalling 60 (to support telling time to nearest 5 minutes) Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: <ul style="list-style-type: none"> a two-digit number and ones a two-digit number and tens two two-digit numbers adding three one-digit numbers Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems Solve problems with addition and subtraction including with missing numbers: <ul style="list-style-type: none"> using concrete objects and pictorial representations, including those involving numbers, quantities and measures applying their increasing knowledge of mental and written methods 	<ul style="list-style-type: none"> Understand multiplication as repeated addition Understand division as sharing and grouping and that a division calculation can have a remainder 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 2, 5 and 10 multiplication tables, including recognising odd and even numbers Derive and use doubles of simple two-digit numbers (numbers in which the ones total less than 10) Derive and use halves of simple two-digit even numbers (numbers in which the tens are even) Calculate mathematical statements for multiplication using repeated addition and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals ($=$) signs Solve problems involving multiplication and division (including those with remainders), using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
Number – fractions	Geometry – properties of shapes	Measurement
<ul style="list-style-type: none"> Understand and use the terms numerator and denominator Understand that a fraction can describe part of a set Understand that the larger the denominator is, the more pieces it is split into and therefore the smaller each part will be Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ Count on and back in steps of $\frac{1}{2}$ and $\frac{1}{4}$ 	<ul style="list-style-type: none"> Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] 	<ul style="list-style-type: none"> Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}\text{C}$); capacity and volume (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels Compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$ Recognise and use symbols for pounds (£) and pence (p) Combine amounts to make a particular value Find different combinations of coins that equal the same amounts of money Compare and sequence intervals of time Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times Know the number of minutes in an hour and the number of hours in a day Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change and measures (including time)
	Geometry – position and direction	
	<ul style="list-style-type: none"> Order/arrange combinations of mathematical objects in patterns/sequences Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise) 	
	Statistics	
	<ul style="list-style-type: none"> Compare and sort objects, numbers and common 2-D and 3-D shapes and everyday objects Interpret and construct simple pictograms, tally charts, block diagrams and simple tables Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity Ask and answer questions about totalling and comparing categorical data 	

Key Learning in Mathematics – Year 3

Number – number and place value	Number – addition and subtraction	Number – multiplication and division
<ul style="list-style-type: none"> Count from 0 in multiples of 4, 8, 50 and 100 Count up and down in tenths Read and write numbers up to 1000 in numerals and in words Read and write numbers with one decimal place Identify, represent and estimate numbers using different representations (including the number line) Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) Identify the value of each digit to one decimal place Partition numbers in different ways (e.g. $146 = 100 + 40 + 6$ and $146 = 130 + 16$) Compare and order numbers up to 1000 Compare and order numbers with one decimal place Find 1, 10 or 100 more or less than a given number Round numbers to at least 1000 to the nearest 10 or 100 Find the effect of multiplying a one- or two-digit number by 10 and 100, identify the value of the digits in the answer Describe and extend number sequences involving counting on or back in different steps Read Roman numerals from I to XII Solve number problems and practical problems involving these ideas 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) Select a mental strategy appropriate for the numbers involved in the calculation Understand and use take away and difference for subtraction, deciding on the most efficient method for the numbers involved, irrespective of context Recall/use addition/subtraction facts for 100 (multiples of 5 and 10) Derive and use addition and subtraction facts for 100 Derive and use addition and subtraction facts for multiples of 100 totalling 1000 Add and subtract numbers mentally, including: <ul style="list-style-type: none"> 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 three digits, using formal written methods of columnar addition and subtraction Estimate the answer to a calculation and use inverse operations to check answers Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) Understand that division is the inverse of multiplication and vice versa Understand how multiplication and division statements can be represented using arrays Understand division as sharing and grouping and use each appropriately Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables Derive and use doubles of all numbers to 100 and corresponding halves Derive and use doubles of all multiples of 50 to 500 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 Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy Solve problems, including missing number problems, involving multiplication and division (and interpreting remainders), including positive integer scaling problems and correspondence problems in which n objects are connected to m objects
Number – fractions	Geometry – properties of shapes	Measures
<ul style="list-style-type: none"> Show practically or pictorially that a fraction is one whole number divided by another (e.g. $\frac{3}{4}$ can be interpreted as $3 \div 4$) Understand that finding a fraction of an amount relates to division Recognise that tenths arise from dividing objects into 10 equal parts and in dividing one-digit numbers or quantities by 10 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 Recognise and show, using diagrams, equivalent fractions with small denominators Add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$] Compare and order unit fractions, and fractions with the same denominators (including on a number line) Count on and back in steps of $\frac{1}{2}$, $\frac{1}{4}$ and $\frac{1}{3}$ Solve problems that involve all of the above 	<ul style="list-style-type: none"> Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them Recognise angles as a property of 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 	<ul style="list-style-type: none"> Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) Continue to estimate and measure temperature to the nearest degree ($^{\circ}\text{C}$) using thermometers Understand perimeter is a measure of distance around the boundary of a shape Measure the perimeter of simple 2-D shapes 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/read time with increasing accuracy to the nearest minute Record/compare time in terms of seconds, minutes, hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon, midnight Know the number of seconds in a minute and the number of days in each month, year and leap year Compare durations of events [for example to calculate the time taken by particular events or tasks] Continue to recognise and use the symbols for pounds (£) and pence (p) and understand that the decimal point separates pounds/pence Recognise that ten 10p coins equal £1 and that each coin is $\frac{1}{10}$ of £1 Add and subtract amounts of money to give change, using both £ and p in practical contexts Solve problems involving money and measures and simple problems involving passage of time
	Geometry – position and direction	
	<ul style="list-style-type: none"> Describe positions on a square grid labelled with letters and numbers 	
	Statistics	
	<ul style="list-style-type: none"> Use sorting diagrams to compare and sort objects, numbers and common 2-D and 3-D shapes and everyday objects Interpret and present data using bar charts, pictograms and tables 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 	

Key Learning in Mathematics – Year 4

Number – number and place value	Number – addition and subtraction	Number – multiplication and division
<ul style="list-style-type: none"> Count in multiples of 6, 7, 9, 25 and 1000 Count backwards through zero to include negative numbers Count up and down in hundredths Read and write numbers to at least 10 000 Read and write numbers with up to two decimal places Recognise the place value of each digit in a four-digit number Identify the value of each digit to two decimal places Partition numbers in different ways (e.g. $2.3 = 2 + 0.3$ & $1 + 1.3$) Identify, represent and estimate numbers using different representations (including the number line) Order and compare numbers beyond 1000 Order and compare numbers with the same number of decimal places up to two decimal places Find 0.1, 1, 10, 100 or 1000 more or less than a given number Round any number to the nearest 10, 100 or 1000 Round decimals (one decimal place) to the nearest whole number Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer Describe and extend number sequences involving counting on or back in different steps, including sequences with multiplication and division steps Read Roman numerals to 100 and know that over time, the numeral system changed to include the concept of zero and place value Solve number and practical problems that involve all of the above and with increasingly large positive numbers 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) Select a mental strategy appropriate for the numbers involved in the calculation Recall and use addition and subtraction facts for 100 Recall and use +/- facts for multiples of 100 totalling 1000 Derive and use addition and subtraction facts for 1 and 10 (with decimal numbers to one decimal place) Add and subtract mentally combinations of two and three digit numbers and decimals to one decimal place Add and subtract numbers with up to 4 digits and decimals with one decimal place using the formal written methods of columnar addition and subtraction where appropriate Estimate; use inverse operations to check answers to a calculation Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why Solve addition and subtraction problems involving missing numbers 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) Recognise and use factor pairs and commutativity in mental calculations Recall multiplication and division facts for multiplication tables up to 12×12 Use partitioning to double or halve any number, including decimals to one decimal place Use place value, known and derived facts to multiply and divide mentally, including: <ul style="list-style-type: none"> - multiplying by 0 and 1 - dividing by 1 - multiplying together three numbers Multiply two-digit and three-digit numbers by a one-digit number using formal written layout Divide numbers up to 3 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, division (including interpreting remainders), integer scaling problems and harder correspondence problems such as n objects
Number – fractions and decimals <ul style="list-style-type: none"> Understand that a fraction is one whole number divided by another (e.g. $\frac{3}{4}$ can be interpreted as $3 \div 4$) Recognise, find and write fractions of a discrete set of objects including those with a range of numerators and denominators Recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten Count on and back in steps of unit fractions Compare and order unit fractions and fractions with the same denominators (including on a number line) Recognise and show, using diagrams, families of common equivalent fractions Recognise and write decimal equivalents of any number of tenths or hundredths Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ Add and subtract fractions with the same denominator (using diagrams) 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 Solve simple measure and money problems involving fractions and decimals to two decimal places 	Geometry – properties of shapes <ul style="list-style-type: none"> Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes Identify lines of symmetry in 2-D shapes presented in different orientations Complete a simple symmetric figure with respect to a specific line of symmetry Continue to 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 	Measurement <ul style="list-style-type: none"> Estimate, compare and calculate different measures, including money in pounds and pence Order temperatures including those below 0°C Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres Know area is a measure of surface within a given boundary Find the area of rectilinear shapes by counting squares Convert between different units of measure [e.g. kilometre to metre; hour to minute] Read, write and convert time between analogue and digital 12- and 24-hour clocks Write amounts of money using decimal notation Recognise that one hundred 1p coins equal $\text{£}1$ and that each coin is $\frac{1}{100}$ of $\text{£}1$ Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days and problems involving money and measures
	Geometry – position and direction <ul style="list-style-type: none"> Describe positions on a 2-D grid as coordinates in the first quadrant Plot specified points and draw sides to complete a given polygon Describe movements between positions as translations of a given unit to the left/right and up/down 	
	Statistics <ul style="list-style-type: none"> Use a variety of sorting diagrams to compare and classify numbers and geometric shapes based on their properties and sizes Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts, time graphs Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs 	

Key Learning in Mathematics – Year 5

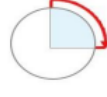





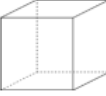

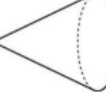

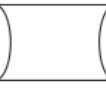

Number – number and place value	Number – addition and subtraction	Number – multiplication and division
<ul style="list-style-type: none"> Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 Count forwards and backwards in decimal steps Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit Read, write, order and compare numbers with up to 3 decimal places Identify the value of each digit to three decimal places Identify represent and estimate numbers using the number line Find 0.01, 0.1, 1, 10, 100, 1000 and other powers of 10 more or less than a given number Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 Round decimals with two decimal places to the nearest whole number and to one decimal place Multiply/divide whole numbers and decimals by 10, 100 and 1000 Interpret negative numbers in context, count on and back with positive and negative whole numbers, including through zero Describe and extend number sequences including those with multiplication/division steps and where the step size is a decimal Read Roman numerals to 1000 (M); recognise years written as such Solve number and practical problems that involve all of the above 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) Select a mental strategy appropriate for the numbers involved in the calculation Recall and use addition and subtraction facts for 1 and 10 (with decimal numbers to one decimal place) Derive and use addition and subtraction facts for 1 (with decimal numbers to two decimal places) Add and subtract numbers mentally with increasingly large numbers and decimals to two decimal places Add and subtract whole numbers with more than 4 digits and decimals with two decimal places, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Solve addition and subtraction problems involving missing numbers 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) 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 (2) and cube (3) numbers, and notation Use partitioning to double or halve any number, including decimals to two decimal places Multiply and divide numbers mentally drawing upon known facts Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context Use estimation/inverse to check answers to calculations; determine, in the context of a problem, an appropriate degree of accuracy Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates
Number – fractions, decimals and percentages	Geometry – properties of shapes	Measurement
<ul style="list-style-type: none"> Recognise mixed numbers and improper fractions and convert from one form to the other Read and write decimal numbers as fractions (e.g. $0.71 = \frac{71}{100}$) Count on and back in mixed number steps such as $1\frac{1}{2}$ Compare and order fractions whose denominators are all multiples of the same number (including on a number line) Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents Add and subtract fractions with denominators that are the same and that are multiples of the same number (using diagrams) Write statements > 1 as a mixed number (e.g. $\frac{4}{2} + \frac{1}{2} = 2 = 1\frac{1}{2}$) Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal Solve problems involving fractions and decimals to three places Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{3}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and fractions with a denominator of a multiple of 10 or 25 	<ul style="list-style-type: none"> 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 Identify 3-D shapes from 2-D representations Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles Draw given angles, and measure them in degrees ($^{\circ}$) Identify: <ul style="list-style-type: none"> angles at a point and one whole turn (total 360°) angles at a point on a straight line and half a turn (total 180°) other multiples of 90° 	<ul style="list-style-type: none"> Use, read and write standard units of length and mass Estimate (and calculate) volume ((e.g., using 1 cm^3 blocks to build cuboids (including cubes)) and capacity (e.g. using water) Understand the difference between liquid volume and solid volume Continue to order temperatures including those below 0°C Convert between different units of metric measure Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints Measure/calculate the perimeter of composite rectilinear shapes Calculate and compare the area of rectangle, use standard units square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes Continue to read, write and convert time between analogue and digital 12 and 24-hour clocks Solve problems involving converting between units of time Use all four operations to solve problems involving measure using decimal notation, including scaling
	Geometry – position and direction	
	<ul style="list-style-type: none"> Describe positions on the first quadrant of a coordinate grid Plot specified points and complete shapes 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 	
	Statistics	
	<ul style="list-style-type: none"> Complete and interpret information in a variety of sorting diagrams (including those used to sort properties of numbers and shapes) Complete, read and interpret information in tables and timetables Solve comparison, sum and difference problems using information presented in all types of graph including a line graph Calculate and interpret the mode, median and range 	

Key Learning in Mathematics – Year 6

Number – number and place value	Number – addition and subtraction	Number – multiplication and division
<ul style="list-style-type: none"> Count forwards or backwards in steps of integers, decimals, powers of 10 Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit Identify the value of each digit to three decimal places Identify, represent and estimate numbers using the number line Order and compare numbers including integers, decimals and negative numbers Find 0.001, 0.01, 0.1, 1, 10 and powers of 10 more/less than a given number Round any whole number to a required degree of accuracy Round decimals with three decimal places to the nearest whole number or one or two decimal places Multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places Use negative numbers in context, and calculate intervals across zero Describe and extend number sequences including those with multiplication and division steps, inconsistent steps, alternating steps and those where the step size is a decimal Solve number and practical problems that involve all of the above 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) Select a mental strategy appropriate for the numbers in the calculation Recall and use addition and subtraction facts for 1 (with decimals to two decimal places) Perform mental calculations including with mixed operations and large numbers and decimals Add and subtract whole numbers and decimals using formal written methods (columnar addition and subtraction) Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy Use knowledge of the order of operations to carry out calculations Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Solve problems involving all four operations, including those with missing numbers 	<ul style="list-style-type: none"> Choose an appropriate strategy to solve a calculation based upon the numbers involved (recall a known fact, calculate mentally, use a jotting, written method) Identify common factors, common multiples and prime numbers Use partitioning to double or halve any number Perform mental calculations, including with mixed operations and large numbers Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication Multiply one-digit numbers with up to two decimal places by whole numbers Divide numbers up to 4 digits by a two-digit whole number using the formal written methods of short or long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context Use written division methods in cases where the answer has up to two decimal places Use estimation and inverse to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy Use knowledge of the order of operations to carry out calculations Solve problems involving all four operations, including those with missing numbers
Number – fractions, decimals and percentages <ul style="list-style-type: none"> Compare and order fractions, including fractions > 1 (including on a number line) Use common factors to simplify fractions; use common multiples to express fractions in the same denominator Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts Associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375 and $\frac{3}{8}$) 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. $\frac{1}{4} \times \frac{2}{5} = \frac{1}{10}$) Divide proper fractions by whole numbers (e.g. $\frac{1}{2} \div 2 = \frac{1}{4}$) Find simple percentages of amounts Solve problems involving fractions Solve problems which require answers to be rounded to specified degrees of accuracy Solve problems involving the calculation of percentages (e.g. of measures and such as 15% of 260) and the use of percentages for comparison 	Geometry – properties of shapes <ul style="list-style-type: none"> Compare/classify geometric shapes based on the properties and sizes Draw 2-D shapes using given dimensions and angles Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius Recognise, describe and build simple 3-D shapes, including making nets Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles Find unknown angles in any triangles, quadrilaterals, regular polygons 	Measurement <ul style="list-style-type: none"> Use, read and write standard units of length, mass, volume and time using decimal notation to three decimal places Convert between standard units of length, mass, volume and time using decimal notation to three decimal places Convert between miles and kilometres Recognise that shapes with the same areas can have different perimeters and vice versa Calculate the area of parallelograms and triangles Recognise when it is possible to use formulae for area and volume of shapes 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) Calculate differences in temperature, including those that involved a positive and negative temperature Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
	Geometry – position and direction <ul style="list-style-type: none"> Describe positions on the full coordinate grid (all four quadrants) Draw and translate simple shapes on the coordinate plane, and reflect them in the axes 	
	Statistics <ul style="list-style-type: none"> Continue to complete and interpret information in a variety of sorting diagrams (including sorting properties of numbers and shapes) Interpret and construct pie charts and line graphs and use these to solve problems Solve comparison, sum and difference problems using information presented in all types of graph Calculate and interpret the mean as an average 	
	Algebra <ul style="list-style-type: none"> Use simple formulae Generate and describe linear number sequences Express missing number problems algebraically Find pairs of numbers that satisfy an equation with two unknowns Enumerate possibilities of combinations of two variables 	
Ratio and proportion <ul style="list-style-type: none"> Solve problems involving the relative sizes of two quantities where missing values can be found using integer multiplication/division facts Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples Solve problems involving similar shapes where the scale factor is known or can be found 		

Appendix 1

Year One Maths Organiser

Doubles		Halves		2D Shapes		Numerals and Number Names				Turns	
6	12	12	6	circle	1 curved side 0 vertices	0	zero	10	ten	Quarter Turn	Three-quarter Turn
7	14	14	7	triangle	3 straight sides 3 vertices	1	one	20	twenty		
8	16	16	8	rectangle	4 straight sides 4 right-angled vertices	2	two	30	thirty	1 right angle quarter turn 90°	3 right angles 3 quarter turns 270°
9	18	18	9			3	three	40	forty		
10	20	20	10			4	four	50	fifty		
Symbols and Language				3D Shapes		5	five	60	sixty	Clockwise	Anti-Clockwise
+	plus add	sphere		6	six	70	seventy				
-	minus subtract	pyramid		7	seven	80	eighty				
=	is equal to	cube		8	eight	90	ninety				
5 - 3 = 2	difference	cuboid		9	nine	100	one hundred				
odd numbers	numbers ending with 1, 3, 5, 7 or 9	cone		Number Bonds Within 10				Half Past		The long minute hand points to six and the short hour hand points past the hour.	
even numbers	numbers ending with 2, 4, 6, 8 or 0	cylinder		6	0 + 6, 1 + 5 2 + 4, 3 + 3	7	0 + 7, 1 + 6 2 + 5, 3 + 4	24 hours in a day.	60 minutes in an hour		
Derived Facts				8	0 + 8, 1 + 7, 2 + 6 3 + 5, 4 + 4	9	0 + 9, 1 + 8, 2 + 7 3 + 6, 4 + 5	60 seconds in a minute			
		part + part = whole	3 + 1 = 4	10	0 + 10, 1 + 9, 2 + 8 3 + 7, 4 + 6, 5 + 5			A.M. - Morning	P.M. - Afternoon		
		part + part = whole	1 + 3 = 4					Midday – 12:00PM	Midnight – 12:00AM		
		whole - part = part	4 - 3 = 1					Place Value Grid			
		whole - part = part	4 - 1 = 3						tens	ones	
									10	1	

Appendix 2

Number and Place Value [NPV]	Number Facts [NF]	Addition and Subtraction [AS]	Multiplication and Division [MD]	Fractions [F]	Geometry [G]
One part is ____. The other part is ____. The whole is ____.	One more than ____ is ____	____ plus ____ is equal to ____	____ groups of ____ are equal to ____	Half of ____ is equal to ____	A circle has one curved side.
	One less than ____ is ____	____ subtract ____ is equal to ____	____ shared equally into groups of ____ makes ____ groups.	When I halve a number, I make two equal parts	A square has 4 straight sides and 4 vertices.
____ is the whole. ____ is a part, and ____	This number pattern is increasing by ____	When we subtract, we start with the whole	I shared ____ into ____ equal groups. There are ____ in each group.	A half is one of two equal parts.	A triangle has 3 straight sides and 3 vertices.
The parts are ____ and ____ The whole is ____	This number pattern is decreasing by ____	The whole is ____ The parts are ____ and ____	The pattern is increasing in ____	There are ____ parts in total. ____ parts are shaded	A ____ has ____ sides and ____ vertices.
____ is equal to ____	____ plus ____ is greater than ____ because ____	To find the unknown part/whole I need to ____	The pattern is decreasing in ____		
I can partition ____ into ____ and ____	If I know ____ then I know ____ because ____	The difference between ____ and ____ is ____	There are ____ groups of ten. There are ____ ones.	Measurement [M]	
This represents ____ because ____	I know ____ plus ____ is equal to ____ so I know that ____ and ____ plus ____ is equal to ____	____ is (so many) greater than ____	____ groups of ten are equal to ____	There are 7 days in a week.	There are 60 seconds in a minute.
____ is greater than ____		____ and ____ have a difference of ____	____ groups of two are equal to ____	There are 12 months in a year.	One pound is the same as one hundred pence.
____ is less than ____	____ and ____ make ____		There will be ____ in each group.	____ is longer/shorter because ____	____ is heavier/lighter because ____

Reasoning STEMS	I know that because ____	My representation shows this because ____
The calculation which represents this is ____	I chose this strategy because ____	I will use the ____ strategy to ____

Appendix 3

