Year 1 - Progression of Skills and Vocabulary in Mathematics

<table>
<tr><td>Year 1</td><td colspan="3">National Curriculum:
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.</td></tr>
<tr><td colspan="4">Number and Place Value</td></tr>
<tr><td>Counting</td><td>Comparing Numbers</td><td colspan="2">Identifying, Representing and Estimating Numbers</td></tr>
<tr><td>To count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.
To count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens.
To identify one more and one less, from a given number.</td><td>To use the language of equal to, more than, less than (fewer), most, least</td><td colspan="2">To identify and represent numbers using objects and pictorial representations including the number line</td></tr>
<tr><td>Reading and Writing Numbers</td><td>Understanding Place Value</td><td colspan="2">Rounding</td></tr>
<tr><td>To read and write numbers from 1 to 20 in numerals and words.</td><td></td><td colspan="2"></td></tr>
<tr><td>Problem Solving</td><td colspan="3">Key Vocabulary- Number and Place Value</td></tr>
<tr><td></td><td colspan="3">numeral, twenty- one twenty-two… one hundred, forwards, backwards, equal to, equivalent to, most, least, many, multiple of, half-way between, above, below, roughly, tens, ones, digit, compare, order</td></tr>
<tr><td colspan="4">Addition and Subtraction</td></tr>
<tr><td>Number Bonds</td><td>Mental Calculations</td><td colspan="2">Written Calculations</td></tr>
<tr><td>To represent and use number bonds and related subtraction facts within 20</td><td>To add and subtract one-digit and two-digit numbers to 20, including zero.
To read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.</td><td colspan="2">To read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</td></tr>
<tr><td>Inverse Operations, Estimating and Checking Answers</td><td>Problem Solving</td><td colspan="2">Key Vocabulary- Addition and Subtraction</td></tr>
</table>

	To solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems *such as 7 = □ - 9*	addition, sum, total, near, double, half, halve, subtract, take away, equals, is the same as, number bonds, pairs, missing number
Multiplication and Division		
Multiplication and Division Facts	*Mental Calculation*	*Written Calculation*
To count in multiples of twos, fives and tens.		
Properties of Numbers: Multiples, Factors, Primes, Square and Cube Numbers	*Inverse Operations, Estimating and Checking Answers*	*Problem Solving*
Key Vocabulary- Multiplication and Division	multiplication, multiply, multiplied by, multiple, division, dividing, grouping, array	
		To 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.
Fractions		
Counting in Fractional Steps	*Recognising Fractions*	*Comparing Fractions*
	To recognise, find and name a half as one of two equal parts of an object, shape or quantity. To recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.	
Comparing Decimals	*Rounding including Decimals*	*Equivalence including Fractions, Decimals and Percentages*
Addition and Subtraction of Fractions	*Multiplication and Division of Fractions*	*Multiplication and Division of Decimals*
Problem Solving	Key Vocabulary- Fractions	
	fraction, equal part, equal grouping, equal sharing, one of two equal parts, one of four equal parts, quarter	
Measurement		
Comparing and Estimating	*Measuring and Calculating*	
To 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 than, lighter than]* • capacity and volume *[e.g. full/empty, more than, less than, half, half full, quarter]* • time *[e.g. quicker, slower, earlier, later]*	To measure and begin to record the following: • lengths and heights • mass/weight • capacity and volume • time *(hours, minutes, seconds)* To recognise and know the value of different denominations of coins and notes.	

To sequence events in chronological order using language *[e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]*	
Telling the Time	*Converting*
To tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. To recognise and use language relating to dates, including days of the week, weeks, months and years.	
Key Vocabulary- Measurement	measurement, roughly, compare, estimate, guess, centimetre, length, ruler, metre stick, height, width, depth, kilogram, half kilogram, litre, half litre, capacity, volume, quarter full, months of the year, seasons, weekend, month, year, earlier, later, first, midnight, date, how long ago?, How long will it be to?, always, sometimes, never, often, usually, once, twice, half past, o'clock, quarter past, quarter to, clock face, hour hand, minute hand, change, dear, costs more, cheap, costs less, how much?, total.
Geometry- Properties of Shape	
Identifying Shapes and their Properties	*Drawing and constructing*
To recognise and name common 2-D and 3-D shapes, including: • 2-D shapes *[e.g. rectangles (including squares), circles and triangles]* • 3-D shapes *[e.g. cuboids (including cubes), pyramids and spheres].*	
Comparing and Classifying	*Angles*
Key Vocabulary- Properties of Shape	symmetry, symmetrical, shape, 2D, 3D, curved, straight, flat, hollow, pattern, repeating pattern, solid, sort, point, pointed, cuboid, cylinder, face, vertices, edges, sides, corner
Geometry- Position and Direction	
Position, Direction and Movement	To describe position, direction and movement, including half, quarter and three-quarter turns.
Key Vocabulary- Position and Direction	position, underneath, opposite, centre, direction, journey, movement, whole turn, half turn, quarter turn, three-quarter turn.
Statistics	
Interpreting, Constructing and Presenting Data	*Problem Solving*
Key Vocabulary- Statistics	vote, table, sort, group, set, list

Algebra		
Equations	*Formulae*	*Sequences*
To solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems *such as 7 = ? – 9*		To sequence events in chronological order using language *such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening*

To represent and use number bonds and related subtraction facts within 20.		

Year 2 - Progression of Skills and Vocabulary in Mathematics

<table>
<tr><td>Year 2</td><td colspan="3">National Curriculum:
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.</td></tr>
<tr><td colspan="4">Number and Place Value</td></tr>
<tr><td>Counting</td><td>Comparing Numbers</td><td colspan="2">Identifying, Representing and Estimating Numbers</td></tr>
<tr><td>To count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward.</td><td>To compare and order numbers from 0 up to 100; use <, > and = signs</td><td colspan="2">To identify, represent and estimate numbers using different representations, including the number line</td></tr>
<tr><td>Reading and Writing Numbers</td><td>Understanding Place Value</td><td colspan="2">Rounding</td></tr>
<tr><td>To read and write numbers to at least 100 in numerals and in words.</td><td>To recognise the place value of each digit in a two-digit number (tens, ones).</td><td colspan="2"></td></tr>
<tr><td>Problem Solving</td><td colspan="3">Key Vocabulary- Number and Place Value</td></tr>
<tr><td>To use place value and number facts to solve problems.</td><td colspan="3">two hundred… one thousand, threes, fours, and so on, tally, sequence, continue, predict, rule, <, >, greater than, less than, one digit, two-digit, three-digit, place value, stands for, represents, exchange, exact</td></tr>
<tr><td colspan="4">Addition and Subtraction</td></tr>
<tr><td>Number Bonds</td><td>Mental Calculations</td><td colspan="2">Written Calculations</td></tr>
<tr><td>To recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100.</td><td>To 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
To show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.</td><td colspan="2">To read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</td></tr>
<tr><td>Inverse Operations, Estimating and Checking Answers</td><td>Problem Solving</td><td colspan="2">Key Vocabulary- Addition and Subtraction</td></tr>
</table>

To recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	To 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	one hundred more, one hundred less, number facts, tens boundary
Multiplication and Division		
Multiplication and Division Facts	*Mental Calculation*	*Written Calculation*
To recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	To show that multiplication of two numbers can be done in any order *(commutative)* and division of one number by another cannot.	To calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs.
Properties of Numbers: Multiples, Factors, Primes, Square and Cube Numbers	*Inverse Operations, Estimating and Checking Answers*	*Problem Solving*
		To solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.
Key Vocabulary- Multiplication and Division	groups of, times, once, twice, three times, ten times, repeated addition, divide, divided into, share, share equally, left over, group in pairs, threes, tens, row, column, multiplication table, fact	
Fractions		
Counting in Fractional Steps	*Recognising Fractions*	*Comparing Fractions*
To count in fractions up to 10, starting from any number and using the ½ and 2/4 equivalence on the number line *(Non-Statutory Guidance).*	To recognise, find, name and write fractions 1/3, ¼, 2/3 and ¾ of a length, shape, set of objects or quantity	
Comparing Decimals	*Rounding including Decimals*	*Equivalence including Fractions, Decimals and Percentages*
		To write simple fractions *e.g. ½ of 6 = 3* and recognise the equivalence of 2/4 and ½
Addition and Subtraction of Fractions	*Multiplication and Division of Fractions*	*Multiplication and Division of Decimals*
Problem Solving	Key Vocabulary- Fractions	
	equivalent fraction, mixed number, numerator, denominator, two halves, two quarters, three quarters, one third, two thirds, one of three equal parts.	
Measurement		

Comparing and Estimating	*Measuring and Calculating*
To compare and order lengths, mass, volume/capacity and record the results using >, < and =. To compare and sequence intervals of time.	To 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. To recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value. To find different combinations of coins that equal the same amounts of money. To solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.
Telling the Time	*Converting*
To 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. To know the number of minutes in an hour and the number of hours in a day.	To know the number of minutes in an hour and the number of hours in a day.
Key Vocabulary- Measurement	measuring scale, further, furthest, tape measure, gram, millilitre, contains, temperature, degree, fortnight, 5, 10, 15 minutes past, digital, analogue, watch, timer, seconds, bought, sold
Geometry- Properties of Shape	
Identifying Shapes and their Properties	*Drawing and constructing*
To identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. To identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces. To identify 2-D shapes on the surface of 3-D shapes, *[for example, a circle on a cylinder and a triangle on a pyramid].*	
Comparing and Classifying	*Angles*
To compare and sort common 2-D and 3-D shapes and everyday objects.	
Key Vocabulary- Properties of Shape	surface, line symmetry, rectangular, circular, triangular, pentagon, hexagon, octagon
Geometry- Position and Direction	
Position, Direction and Movement	To 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).* To order and arrange combinations of mathematical objects in patterns and sequences.
Key Vocabulary- Position and Direction	route, higher, lower, clockwise, anticlockwise, right angle, straight line
Statistics	
Interpreting, Constructing and Presenting Data	*Problem Solving*
To interpret and construct simple pictograms, tally charts, block diagrams and simple tables.	

To ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. To ask and answer questions about totalling and comparing categorical data.	
Key Vocabulary- Statistics	tally, graph, block graph, pictogram, represent, label, title, most popular, most common, least popular, least common

Algebra		
Equations	*Formulae*	*Sequences*
To recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems. To recall and use addition and subtraction facts to 20 fluently and derive and use related facts up to 100.		To compare and sequence intervals of time. To order and arrange combinations of mathematical objects in patterns.

Year 3 - Progression of Skills and Vocabulary in Mathematics

<table>
<tr><td>Year 3</td><td colspan="3">National Curriculum:
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.</td></tr>
<tr><td colspan="4">Number and Place Value</td></tr>
<tr><td>Counting</td><td colspan="2">Comparing Numbers</td><td>Identifying, Representing and Estimating Numbers</td></tr>
<tr><td>To count from 0 in multiples of 4, 8, 50 and 100.
To find 10 or 100 more or less than a given number.</td><td colspan="2">To compare and order numbers up to 1000.</td><td>To identify, represent and estimate numbers using different representations.</td></tr>
<tr><td>Reading and Writing Numbers</td><td colspan="2">Understanding Place Value</td><td>Rounding</td></tr>
<tr><td>To read and write numbers up to 1000 in numerals and in words.</td><td colspan="2">To recognise the place value of each digit in a three-digit number (hundreds, tens, ones).</td><td></td></tr>
<tr><td>Problem Solving</td><td colspan="3">Key Vocabulary- Number and Place Value</td></tr>
<tr><td>To solve number problems and practical problems involving these ideas.</td><td colspan="3">eights, fifties, hundreds, factor of, relationship, roman numerals, one hundred more, one hundred less, approximate, round, nearest, round up, round down</td></tr>
<tr><td colspan="4">Addition and Subtraction</td></tr>
<tr><td>Number Bonds</td><td colspan="2">Mental Calculations</td><td>Written Calculations</td></tr>
<tr><td></td><td colspan="2">To add and subtract numbers mentally, including:
• a three-digit number and ones
• a three-digit number and tens
• a three-digit number and hundreds</td><td>To add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.</td></tr>
<tr><td>Inverse Operations, Estimating and Checking Answers</td><td colspan="2">Problem Solving</td><td>Key Vocabulary- Addition and Subtraction</td></tr>
<tr><td>To estimate the answer to a calculation and use inverse operations to check answers.</td><td colspan="2">To solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</td><td>Hundreds, boundary</td></tr>
<tr><td colspan="4">Multiplication and Division</td></tr>
</table>

Multiplication and Division Facts	*Mental Calculation*	*Written Calculation*
To recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.	To 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.	To 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.
Properties of Numbers: Multiples, Factors, Primes, Square and Cube Numbers	*Inverse Operations, Estimating and Checking Answers*	*Problem Solving*
	To estimate the answer to a calculation and use inverse operations to check answers.	To 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.
Key Vocabulary- Multiplication and Division	factor, product, remainder,	
Fractions		
Counting in Fractional Steps	*Recognising Fractions*	*Comparing Fractions*
To count up and down in tenths.	To recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators recognise that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10. To recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators.	To compare and order unit fractions, and fractions with the same denominators.
Comparing Decimals	*Rounding including Decimals*	*Equivalence including Fractions, Decimals and Percentages*
		To recognise and show, using diagrams, equivalent fractions with small denominators.
Addition and Subtraction of Fractions	*Multiplication and Division of Fractions*	*Multiplication and Division of Decimals*
To add and subtract fractions with the same denominator within one whole *(e.g. 5/7 + 1/7 = 6/7)*		
Problem Solving	Key Vocabulary- Fractions	
To solve problems that involve all the above skills.	sixths, sevenths, eighths, tenths	
Measurement		
Comparing and Estimating	*Measuring and Calculating*	

To compare durations of events, for example to calculate the time taken by particular events or tasks. To estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary *such as a.m./p.m., morning, afternoon, noon and midnight.*	To measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml). To measure the perimeter of simple 2-D shapes. To add and subtract amounts of money to give change, using both £ and p in practical contexts.
Telling the Time	*Converting*
To tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks. To estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary *such as a.m./p.m., morning, afternoon, noon and midnight*.	To know the number of seconds in a minute and the number of days in each month, year and leap year.
Key Vocabulary- Measurement	division, approximately, millimeter, kilometer, mile, distance apart, distance between, distance to, distance from, perimeter, centigrade, century, calendar, earliest, latest, am, pm, roman numerals, 12 hour clock time, 24 hour clock time
Geometry- Properties of Shape	
Identifying Shapes and their Properties	*Drawing and constructing*
	To draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
Comparing and Classifying	*Angles*
	To recognise angles as a property of shape or a description of a turn. To 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. To identify horizontal and vertical lines and pairs of perpendicular and parallel lines.
Key Vocabulary- Properties of Shape	perimeter, pentagonal, hexagonal, octagonal, right-angled, parallel, perpendicular, horizontal, vertical, hemisphere, prism, triangular prism, greater angle than, smaller angle than, acute, obtuse
Geometry- Position and Direction	
Position, Direction and Movement	
Key Vocabulary- Position and Direction	compass point, north, south, east, west, diagonal, horizontal, vertical
Statistics	
Interpreting, Constructing and Presenting Data	*Problem Solving*
To interpret and present data using bar charts, pictograms and tables.	To solve one-step and two-step questions *[e.g. 'How many more?' and 'How many fewer?']* using information presented in scaled bar charts and pictograms and tables.
Key Vocabulary- Statistics	chart, frequency table, Carroll diagram, Venn diagram, axis, axes, diagram
Algebra	
Equations	*Formulae* / *Sequences*

To solve problems, including missing number problems, using number facts, place value, and more complex. To solve problems, including missing number problems, involving multiplication and division, including integer scaling.		

Year 4 - Progression of Skills and Vocabulary in Mathematics

<table>
<tr><td>Year 4</td><td colspan="3">National Curriculum:
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.</td></tr>
<tr><td colspan="4">Number and Place Value</td></tr>
<tr><td>Counting</td><td>Comparing Numbers</td><td colspan="2">Identifying, Representing and Estimating Numbers</td></tr>
<tr><td>To count backwards through zero to include negative numbers.
To count in multiples of 6, 7, 9, 25 and 1000.
To find 1000 more or less than a given number.</td><td>To order and compare numbers beyond 1000.</td><td colspan="2">To identify, represent and estimate numbers using different representations.</td></tr>
<tr><td>Reading and Writing Numbers</td><td>Understanding Place Value</td><td colspan="2">Rounding</td></tr>
<tr><td>To 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.</td><td>To recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones).</td><td colspan="2">To round any number to the nearest 10, 100 or 1 000.</td></tr>
<tr><td>Problem Solving</td><td colspan="3">Key Vocabulary- Number and Place Value</td></tr>
<tr><td>To solve number and practical problems that involve all the above and with increasingly large positive numbers.</td><td colspan="3">ten thousand, hundred thousand, million, sixes, sevens, nines, twenty fives, next, consecutive, integer, positive, negative, above zero, below zero, minus, negative numbers, one thousand more, one thousand less, thousand</td></tr>
<tr><td colspan="4">Addition and Subtraction</td></tr>
<tr><td>Number Bonds</td><td>Mental Calculations</td><td colspan="2">Written Calculations</td></tr>
<tr><td></td><td></td><td colspan="2">To add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.</td></tr>
<tr><td>Inverse Operations, Estimating and Checking Answers</td><td>Problem Solving</td><td colspan="2">Key Vocabulary- Addition and Subtraction</td></tr>
</table>

To estimate and use inverse operations to check answers to a calculation.	To solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	inverse
Multiplication and Division		
Multiplication and Division Facts	*Mental Calculation*	*Written Calculation*
To recall multiplication and division facts for multiplication tables up to 12 × 12.	To use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1; dividing by 1; multiplying together three numbers. To recognise and use factor pairs and commutativity in mental calculations.	To multiply two-digit and three-digit numbers by a one-digit number using formal written layout.
Properties of Numbers: Multiples, Factors, Primes, Square and Cube Numbers	*Inverse Operations, Estimating and Checking Answers*	*Problem Solving*
To recognise and use factor pairs and commutativity in mental calculations *(repeated).*	To estimate and use inverse operations to check answers to a calculation.	To 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.*
Key Vocabulary- Multiplication and Division	inverse	
Fractions		
Counting in Fractional Steps	*Recognising Fractions*	*Comparing Fractions*
To count up and down in hundredths.	To recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	
Comparing Decimals	*Rounding including Decimals*	*Equivalence including Fractions, Decimals and Percentages*
To compare numbers with the same number of decimal places up to two decimal places.	To round decimals with one decimal place to the nearest whole number.	To recognise and show, using diagrams, families of common equivalent fractions. To recognise and write decimal equivalents of any number of tenths or hundredths. To recognise and write decimal equivalents to ¼ ½ ¾.
Addition and Subtraction of Fractions	*Multiplication and Division of Fractions*	*Multiplication and Division of Decimals*
To add and subtract fractions with the same denominator.		To 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.
Problem Solving	Key Vocabulary- Fractions	

To 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. To solve simple measure and money problems involving fractions and decimals to two decimal places.	hundredths, decimal, decimal fraction, decimal point, decimal place, decimal equivalent, proportion

Measurement	
Comparing and Estimating	*Measuring and Calculating*
To estimate, compare and calculate different measures, including money in pounds and pence.	To estimate, compare and calculate different measures, including money in pounds and pence. To measure and calculate the perimeter of a rectilinear figure *(including squares)* in centimetres and metres. To find the area of rectilinear shapes by counting squares.
Telling the Time	*Converting*
To read, write and convert time between analogue and digital 12 and 24-hour clocks. To solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	To convert between different units of measure *(e.g. kilometre to metre; hour to minute).* To read, write and convert time between analogue and digital 12 and 24-hour clocks. To solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.
Key Vocabulary- Measurement	unit, standard unit, metric unit, breadth, edge, area, covers, square centimetre cm^2, mass, weight, measuring cylinder, leap year, millennium, noon, date of birth, timetable, arrive, depart

Geometry- Properties of Shape	
Identifying Shapes and their Properties	*Drawing and constructing*
To identify lines of symmetry in 2-D shapes presented in different orientations.	To complete a simple symmetric figure with respect to a specific line of symmetry.
Comparing and Classifying	*Angles*
To compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.	To identify acute and obtuse angles and compare and order angles up to two right angles by size.
Key Vocabulary- Properties of Shape	line, construct, sketch, centre, angle, right-angled base, square-based, reflect, reflection, regular, irregular, two-dimensional, oblong, rectilinear, equilateral triangle, isosceles triangle, scalene triangle, heptagon, parallelogram, rhombus, trapezium, polygon, three-dimensional, spherical, cylindrical, tetrahedron, polyhedron

Geometry- Position and Direction	
Position, Direction and Movement	To describe positions on a 2-D grid as coordinates in the first quadrant. To describe movements between positions as translations of a given unit to the left/right and up/down. To plot specified points and draw sides to complete a given polygon.
Key Vocabulary- Position and Direction	north-east, north-west, south-east, south-west, translate, translation, rotate, rotation, degree, reflection, ruler, set square, angle measurer, compass.

Statistics	
Interpreting, Constructing and Presenting Data	*Problem Solving*
To interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	To solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.
Key Vocabulary- Statistics	survey, questionnaire, data

Algebra		
Equations	*Formulae*	*Sequences*
	To express perimeter algebraically as $2(a + b)$ where a and b are the dimensions in the same units.	

Year 5 - Progression of Skills and Vocabulary in Mathematics

Year 5	**National Curriculum:** **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.**

Number and Place Value		
Counting	*Comparing Numbers*	*Identifying, Representing and Estimating Numbers*
To interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. To count forwards or backwards in steps of powers of 10 for any given number up to 1000000.	To read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.	
Reading and Writing Numbers	*Understanding Place Value*	*Rounding*
To read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit. To read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	To read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit.	To round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000.
Problem Solving	Key Vocabulary- Number and Place Value	
To solve number problems and practical problems that involve all the above skills.	factor pair, ≥, greater than or equal to, ≤, less than or equal to, formula, divisibility, square number, prime number, ascending order, descending order, ten thousand	

Addition and Subtraction		
Number Bonds	*Mental Calculations*	*Written Calculations*
	To add and subtract numbers mentally with increasingly large numbers.	To add and subtract whole numbers with more than 4 digits, including using formal written methods *(columnar addition and subtraction).*

Inverse Operations, Estimating and Checking Answers	*Problem Solving*	Key Vocabulary- Addition and Subtraction
To use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.	To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	ones boundary, tenths boundary
Multiplication and Division		
Multiplication and Division Facts	*Mental Calculation*	*Written Calculation*
To count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.	To multiply and divide numbers mentally drawing upon known facts. To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	To 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. To 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.
Properties of Numbers: Multiples, Factors, Primes, Square and Cube Numbers	*Inverse Operations, Estimating and Checking Answers*	*Problem Solving*
To identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. To know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. To establish whether a number up to 100 is prime and recall prime numbers up to 19. To recognise and use square numbers and cube numbers, and the notation for squared ^{2} and cubed ^{3}.		To solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. To solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. To solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.
Key Vocabulary- Multiplication and Division	square, squared, cube, cubed	
Fractions		
Counting in Fractional Steps	*Recognising Fractions*	*Comparing Fractions*
	To recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.	To compare and order fractions whose denominators are all multiples of the same number.
Comparing Decimals	*Rounding including Decimals*	*Equivalence including Fractions, Decimals and Percentages*
To read, write, order and compare numbers with up to three decimal places.	To round decimals with two decimal places to the nearest whole number and to one decimal place.	To identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.

		To read and write decimal numbers as fractions *(e.g. 0.71 = 71/100)* To recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. To 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 as a decimal fraction.
Addition and Subtraction of Fractions	*Multiplication and Division of Fractions*	*Multiplication and Division of Decimals*
To add and subtract fractions with the same denominator and multiples of the same number. To 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)*	To multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	
Problem Solving	Key Vocabulary- Fractions	
To solve problems involving numbers up to three decimal places To solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5, and those with a denominator of a multiple of 10 or 25.	proper fraction, improper fraction, reduced to, cancel, in every, for every, percentage, percent, %	

Measurement	
Comparing and Estimating	*Measuring and Calculating*
To calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes. To estimate volume *(e.g. using 1 cm^3 blocks to build cubes and cuboids)* and capacity *(e.g. using water).*	To use all four operations to solve problems involving measure *(e.g. length, mass, volume, money)* using decimal notation including scaling. To measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. To calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes. To recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}).
Telling the Time	*Converting*

To solve problems involving converting between units of time.	To convert between different units of metric measure *(e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre).* To solve problems involving converting between units of time. To understand and use equivalences between metric units and common imperial units such as inches, pounds and pints.
Key Vocabulary- Measurement	imperial unit, square metre m^2, square millimetre mm^2, pint, gallon

Geometry- Properties of Shape	
Identifying Shapes and their Properties	*Drawing and constructing*
To identify 3-D shapes, including cubes and other cuboids, from 2-D representations.	To draw given angles and measure them in degrees (^{o}).
Comparing and Classifying	*Angles*
To use the properties of rectangles to deduce related facts and find missing lengths and angles. To distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	To know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. To identify: • angles at a point and one whole turn (total 360^o) • angles at a point on a straight line and ½ a turn (total 180^o) • other multiples of 90^o
Key Vocabulary- Properties of Shape	radius, diameter, congruent, axis of symmetry, reflective symmetry, x-axis, y-axis, quadrant, octahedron

Geometry- Position and Direction	
Position, Direction and Movement	To 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.
Key Vocabulary- Position and Direction	coordinate, protractor

Statistics	
Interpreting, Constructing and Presenting Data	*Problem Solving*
To complete, read and interpret information in tables, including timetables.	To solve comparison, sum and difference problems using information presented in a line graph.
Key Vocabulary- Statistics	maximum, minimum, value, outcome, bar line chart, line graph

Algebra		
Equations	*Formulae*	*Sequences*
To use the properties of rectangles to deduce related facts and find missing lengths and angles.		

Year 6 - Progression of Skills and Vocabulary in Mathematics

<table>
<tr><td>Year 6</td><td colspan="3">National Curriculum:
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.</td></tr>
<tr><td colspan="4">Number and Place Value</td></tr>
<tr><td>Counting</td><td>Comparing Numbers</td><td colspan="2">Identifying, Representing and Estimating Numbers</td></tr>
<tr><td>To use negative numbers in context and calculate intervals across zero.</td><td>To read, write, order and compare numbers up to 10000000 and determine the value of each digit</td><td colspan="2"></td></tr>
<tr><td>Reading and Writing Numbers</td><td>Understanding Place Value</td><td colspan="2">Rounding</td></tr>
<tr><td>To read, write, order and compare numbers up to 10000000 and determine the value of each digit</td><td>To read, write, order and compare numbers up to 10000000 and determine the value of each digit.</td><td colspan="2">To round any whole number to a required degree of accuracy.</td></tr>
<tr><td>Problem Solving</td><td colspan="3">Key Vocabulary- Number and Place Value</td></tr>
<tr><td>To solve number and practical problems that involve all the above skills.</td><td colspan="3">factorise, prime factor, digit total</td></tr>
<tr><td colspan="4">Addition and Subtraction</td></tr>
<tr><td>Number Bonds</td><td>Mental Calculations</td><td colspan="2">Written Calculations</td></tr>
<tr><td></td><td>To perform mental calculations, including with mixed operations and large numbers.
To use their knowledge of the order of operations to carry out calculations involving the four operations.</td><td colspan="2"></td></tr>
<tr><td>Inverse Operations, Estimating and Checking Answers</td><td>Problem Solving</td><td colspan="2"></td></tr>
<tr><td>To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.</td><td>To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
To solve problems involving addition, subtraction, multiplication and division.</td><td colspan="2"></td></tr>
</table>

Multiplication and Division		
Multiplication and Division Facts	*Mental Calculation*	*Written Calculation*
	To perform mental calculations, including with mixed operations and large numbers. To associate a fraction with division and calculate decimal fraction equivalents *(e.g. 0.375)* for a simple fraction *(e.g. $^3/_8$).*	To multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. To divide numbers up to 4 digits by a two-digit whole number using the formal written method of short and long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
Properties of Numbers: Multiples, Factors, Primes, Square and Cube Numbers	*Inverse Operations, Estimating and Checking Answers*	*Problem Solving*
To identify common factors, common multiples and prime numbers. To use common factors to simplify fractions; use common multiples to express fractions in the same denomination. To calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3	To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. To use their knowledge of the order of operations to carry out calculations involving the four operations.	To solve problems involving addition, subtraction, multiplication and division. To solve problems involving similar shapes where the scale factor is known or can be found.
Fractions		
Counting in Fractional Steps	*Recognising Fractions*	*Comparing Fractions*
		To compare and order fractions, including fractions >1
Comparing Decimals	*Rounding including Decimals*	*Equivalence including Fractions, Decimals and Percentages*
To identify the value of each digit in numbers given to three decimal places.	To solve problems which require answers to be rounded to specified degrees of accuracy.	To use common factors to simplify fractions; use common multiples to express fractions in the same denomination. To associate a fraction with division and calculate decimal fraction equivalents *(e.g. 0.375)* for a simple fraction *(e.g. 3/8).* To recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Addition and Subtraction of Fractions	*Multiplication and Division of Fractions*	*Multiplication and Division of Decimals*
To add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.	To multiply simple pairs of proper fractions, writing the answer in its simplest form *(e.g. ¼ × ½ = 1/8).* To multiply one-digit numbers with up to two decimal places by whole numbers. To divide proper fractions by whole numbers *(e.g. 1/3 ÷ 2 = 1/6)*	To multiply one-digit numbers with up to two decimal places by whole numbers. To multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places. To identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places. To associate a fraction with division and calculate decimal fraction equivalents *(e.g. 0.375)* for a simple fraction *(e.g. 3/8).* To use written division methods in cases where the answer has up to two decimal places.
Problem Solving		

Measurement	
Comparing and Estimating	*Measuring and Calculating*
To calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3.	To solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. To recognise that shapes with the same areas can have different perimeters and vice versa. To calculate the area of parallelograms and triangles. To calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units *[e.g. mm^3 and km^3].* To recognise when it is possible to use formulae for area and volume of shapes.
Telling the Time	*Converting*
	To use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places. To solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.

Key Vocabulary- Measurement	mile, yard, foot, feet, inch, inches, circumference, tonne, pound, ounce, centiliter, cubic centimeters cm^3, cubic metres m^3, cubic milimetres mm^3, cubic kilometres km^3, interval, running fast, running ahead, running behind, Greenwich Mean Time, British Summer Time, International Date Line, profit, loss

Geometry- Properties of Shape	
Identifying Shapes and their Properties	*Drawing and constructing*
To recognise, describe and build simple 3-D shapes, including making nets. To illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.	To draw 2-D shapes using given dimensions and angles. To recognise, describe and build simple 3-D shapes, including making nets.
Comparing and Classifying	*Angles*
To compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons.	To recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
Key Vocabulary- Properties of Shape	circumference, concentric, arc, net, open, closed, intersecting, intersection, plane, kite, dodecahedron, reflex angle

Geometry- Position and Direction	
Position, Direction and Movement	To describe positions on the full coordinate grid *(all four quadrants).* To draw and translate simple shapes on the coordinate plane and reflect them in the axes.

Statistics	
Interpreting, Constructing and Presenting Data	*Problem Solving*
To interpret and construct pie charts and line graphs and use these to solve problems.	To calculate and interpret the mean as an average.
Key Vocabulary- Statistics	mean, mode, median, range, estimate, statistics, distribution

Algebra		
Equations	*Formulae*	*Sequences*
To express missing number problems algebraically. To find pairs of numbers that satisfy number sentences involving two unknowns. To enumerate all possibilities of combinations of two variables.	To use simple formulae. To recognise when it is possible to use formulae for area and volume of shapes.	To generate and describe linear number sequences.

Ratio and Proportion (Y6 Only)	
Ratio and Proportion	To solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. To solve problems involving the calculation of percentages *[for example, of measures, and such as 15% of 360]* and the use of percentages for comparison. To solve problems involving similar shapes where the scale factor is known or can be found. To solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.