Maths Long Term Plan – Year 5

Year 5 Maths	
National Curriculum Objectives Year 5	Key Links
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.	Year 5– White Rose Maths Maths Guidance Year 5 (Gov.uk) Mathematics Programmes of Study: Key Stage 1 and 2 (Gov.uk)

Topics		N.C Objectives	Small Steps	Key Vocabulary
Autumn 1	Number: Number and Place Value	Pupils should be taught to: • read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit • count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10000 and 100 000 • solve number problems and practical problems that involve all of the above • read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	• numbers to 10,000 • round to nearest 10, 100, 1000 • numbers to 100,000 • compare and order numbers to 100,000 • round numbers with 100,000 • numbers to a million • counting in 10s, 100s, 1000s, 10000, 100000s • compare and order numbers to one million • round numbers to one million • negative numbers • roman numerals to 1000	ones (1s), tens (10s), hundreds (100s), thousands (1000s), place value, Roman numerals, partition, estimate, round up, round down, greater than (>), less than (<), ten thousands (10,000s), hundred thousand (100,000) positive negative rounding, sequence, rule

<u>Maths Progression:</u>

Year 4:

- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- count backwards through zero to include negative numbers
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers.
- 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

Year 6:

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across zero
- solve number and practical problems that involve all of the above.

Topics		N.C Objectives	Small Steps	Key Vocabulary
Autumn 1 and Autumn 2	Number: Addition and Subtraction	Pupils should be taught to: • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • 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.	• Add whole numbers with more than 4 digits (column method) • Subtract whale numbers with more than 4 digits (column method) • round to estimate and approximate • Inverse operations (addition and subtraction) • multi-step addition and subtraction problems	add, subtract, ones (1s), tens (10s), hundreds (100s), thousands (1,000s), ten thousands (10,000s), hundred thousands (100,000s), total, difference, inverse, round, mentally, estimate

Maths Progression:

Year 4:

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Year 6:

- Understand that two numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).
- Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
- Solve problems with 2 unknowns
- Solve problems involving ratio relationships.

Topics		N.C Objectives	Small Steps	Key Vocabulary
Autumn 2 Perimeter	Statistics	Pupils should be taught to: • solve comparison, sum and difference problems using information presented in a line graph • complete, read and interpret information in tables, including timetables.	• Read and interpret line graphs • draw line graphs • use line graphs to solve problems • read and interpret tables • two way tables timetables	line graph, dual line graph, horizontal axis, vertical axis, axes, scale, data, information, interpret, complete, table two-way table

<u>Maths Progression:</u>

Year 4:

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Year 6

- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average.

Topics		N.C Objectives	Small Steps	Key Vocabulary
Autumn 2/Spring 1	Number: Multiplication and Division	Pupils should be taught to: • identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. • use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers. • establish whether a number up to 100 is prime and recall prime numbers up to 19 • 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. • multiply and divide numbers mentally • drawing upon known facts 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 • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • 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	(1) - Autumn • multiples • factors • common factors • prime numbers • square numbers • cube numbers • multiply by 10, 100, and 1,000 • divide by 10, 100, and 1.000 • multiples of 10, 100 and 1,000 (2) - Spring • multiply 4-digits by 1-digit • multiply 2-digits (are model) • multiply 2-digits by 2-digits • multiply 3-digits by 2-digits • multiply 4-digits by 2-digtis • divide 4-digits by 1-digit • divide with remainders	square, and cube numbers multiple, factor, prime, composite, square, cube numbers multiply (x), multiplication fact, times, divide (¸), division, inverse operation, place value total, equal, place value, partition, digit, add, subtract, grid method, column method, represent, factor, multiple, multiply, divide, remainder

<u>Maths Progression:</u>

Year 4:

- Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size.
- Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.
- recall multiplication and division facts for multiplication tables up to 12 × 12
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Year 6:

- solve problems involving addition, subtraction, multiplication and division
- use their knowledge of the order of operations to carry out calculations involving the four operations
- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large number

Topics		N.C Objectives	Small Steps	Key Vocabulary
Spring 1/2	Measurement: Perimeter and Area	Pupils should be taught to: • convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	• measure perimeter • calculate perimeter • area of rectangles • area of compound shapes • area of irregular shapes	perimeter, area, centimetres (cm), metres (m), rectilinear shape, distance, measure, convert) scale formula square centimetre square metre

Maths Progression:

Year 4:

- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares

Year 6:

- recognise that shapes with the same areas can have different perimeters and vice versa
- recognise when it is possible to use formulae for area and volume of shapes
- calculate the area of parallelograms and triangles
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].

Topics		N.C Objectives	Small Steps	Key Vocabulary
Spring 1/Spring 2	Number: Fractions Decimals and Percentages	Pupils should be taught to: • compare and order fractions whose denominators are all multiples of the same number • identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number [for example, 5 2 + 5 4 = 5 6 = 1 5 1 • add and subtract fractions with the same denominator and denominators that are multiples of the same number • multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. • read and write decimal numbers as fractions [for example, 0.71 =100 71] • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • round decimals with two decimal places to the nearest whole number and to one decimal place • read, write, order and compare numbers with up to three decimal places • solve problems involving number up to three decimal places • recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal	Fractions: • equivalent fractions • improper fractions to mixed numbers • mixed numbers to improper fractions • numbers sequences • compare and order fractions less than 1 • compare and order fractions greater than 1 • add and subtract fractions • add fractions within 1 • add 3 or more fractions • add fractions • add mixed numbers • subtract fractions • subtract mixed numbers • subtract - breaking the whole • subtract 2 mixed numbers • multiply unit fractions by an integer • multiply mixed numbers by integers • fraction of an amount • using fractions as operators Decimal and percentages: • decimals up to 2 d.p • decimals as fractions • understand thousandths • thousandths as decimals • rounding decimals • order and compare decimals • understand percentages • percentages as fractions and decimals	equivalent, numerator, denominator, mixed number, convert, sequence, order, multiply (×), multiple, divide (÷), dividend, factor, greater than (>), less than (<), equal to (=), divisor, quotient, expand proper/improper fraction simplify percent, percentage, tenths, hundredths, and thousandths. decimal, decimal place, fraction, place value, digits, and decimal point add, subtract, multiply, divide ones, tenths, hundredths, thousandths difference, group, share, compare,

		• solve problems which require knowing percentage and • decimal equivalents of 2 1 , 4 1 , 5 1 , 5 2 , 5 4 and those fractions with a denominator of a multiple of 10 or 25.	• equivalent F.D.P Decimals: • adding decimals within 1 • subtracting decimals within 1 • complements to 1 • adding decimals - crossing the whole • adding decimals with the same number of decimals places • subtracting decimals with the same number of decimal places • adding decimals with a different number of decimals places • subtracting decimals with a different number of decimal places • adding and subtracting wholes and decimals	represent column,

<u>Maths Progression:</u>

Year 4 :

- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- solve simple measure and money problems involving fractions and decimals to two decimal places.

Year 6:

- Recognise when fractions can be simplified, and use common factors to simplify fractions.
- Express fractions in a common denomination and use this to compare fractions that are similar in value.
- Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.

Topics		N.C Objectives	Small Steps	Key Vocabulary
Summer 1	Geometry: Properties of Shape	Pupils should be taught to: • identify 3-D shapes, including cubes and other cuboids, 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 • identify: angles at a point and one whole turn (total 360o) angles at a point on a straight line and 1/2 a turn (total 180o) other multiples of 90o • use the properties of rectangles to deduce related facts and find missing lengths and angles • distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	• measure angles in degrees • measuring with a protractor • drawing lines and angles accurately • calculating angles on a straight line • calculating angles around a point • calculating lengths and angles in shapes • regular and irregular polygons • reasoning about 3D shapes	angle, turn whole turn, half turn, quarter turn acute angle, right angle, obtuse angle, reflex angle degrees(°) 90 degrees 180 degrees, 360 degrees interior angle protractor parallel perpendicular angle, interior angle regular, irregular polygon, quadrilateral 2D,3D viewpoint

Maths Progression:

Year 4:

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to two right angles by size
- identify lines of symmetry in 2-D shapes presented in different orientations
- complete a simple symmetric figure with respect to a specific line of symmetry.

Year 6:

- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D shapes, including making nets
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

Topics		N.C Objectives	Small Steps	Key Vocabulary
Summer 1/2	Statistics	Pupils should be taught to: • interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. • solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs	• interpret charts • comparison, sum and difference • introducing line graphs • line graphs	line graph', 'discrete data' and 'continuous data' table, bar chart, pictogram, key, compare, altogether, more than, less than, least, most, greatest, smallest, line graph, discrete data, continuous data

Maths Progression:

Year 4:

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Year 6:

- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average.

Topics		N.C Objectives	Small Steps	Key Vocabulary
Summer 2	Measurement: Converting Units	Pupils should be taught to: • convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • solve problems involving converting between units of time • use all four operations to solve problems involving measure [for example, length,	• kilograms and grams • kilometres millimetres • Litres and mililitres • metric units • imperial units • converting units of time • Timetables	mass, capacity, length, time, quantity metric units, gram, kilogram, millilitre, litre, millimetre, centimetre, metre, kilometre imperial units, ounce (oz), pound (lb), stone (st), pint (pt), gallon, inch (in), foot (f), yard (yd) second, minute, hour,

	Measurement: Volume	mass, volume, money] using decimal notation, including scaling. • estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]	• what is volume? • compare volume • estimate volume • estimate capacity	day, week, month, year convert, equal to, equivalent, approximately, per, measure, remainder, multiple timetable, 24-hour, digital, duration volume, capacity, solid, liquid, container cube, cuboid, triangular, prism 3D shapes, objects calculate, estimate, compare, count, accurately, order, amount, irregular, prediction, exact unit (cm) cubes, units of measurement, measure less, more, less than (<), more than (>), largest, smallest, least, greatest, equal space inside height, length, width, size, tall layer, slice multiple, total, take away, whole, part, almost half, identical

				litre (l), millilitre (ml)

Maths Progression:

Year 4:

- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres

Year 6:

- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].
- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- convert between miles and kilometres

Topics		N.C Objectives	Small Steps	Key Vocabulary
Summer 2	Geometry: Position and Direction	Pupils should be taught 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.	• position in the first quadrant • translation • translation with coordinates • reflection • reflection with coordinates	reflection, translation mirror-line coordinate, horizontal coordinate, vertical coordinate horizontal axis, vertical axis

Maths Progression:

Year 4:

- describe positions on a 2-D grid as coordinates in the first quadrant
- describe movements between positions as translations of a given unit to the left/right and up/down
- plot specified points and draw sides to complete a given polygon

Year 6:

- 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.

Key Texts	A remainder of one by Elinor J. Pinczes The Cavern of Clues by David Glover Fractions in disguise by Edward Einhorn Recommendations from MathsThroughStories.org - for specific topics