



Mathematics Progression Document



Nursery to Year 6

White Rose Maths progression for Shawclough Community Primary School

Whole-school fluency progression

Phase	Counting progression	Arithmetic fluency	Number facts and Mad Minutes
Nursery	Join in with number rhymes; develop stable counting order; tag one object with one number; count small sets; compare more, fewer and same.	Subitise up to 3; compose and separate small quantities through play; notice changes when one is added or removed.	Recognise quantities without counting; develop secure small-number patterns through games, stories and practical routines. No formal timed practice.
Reception	Count objects accurately; count beyond 20; count on and back in meaningful contexts; compare quantities to 10.	Explore composition to 10; subitise to 5; use five and ten frames, fingers and stories to calculate.	Automatically recall bonds to 5 and some to 10; recall doubles within 10. Practice is playful, oral and visual.
Year 1	Count within 100; forwards and backwards; from different starting points; in 2s, 5s and 10s.	Add and subtract within 20 using known structures; develop one more/less, doubles, near doubles and part-whole thinking.	Secure bonds within 10 and derive bonds within 20; begin fluent 2, 5 and 10 counting patterns. Short fact practice may begin when understanding is secure.
Year 2	Count in 2s, 3s, 5s and 10s; count from any number in tens.	Recall and apply addition and subtraction facts within 20; use place value to calculate across tens.	Automatic facts within 20; complements to 100 in tens; 2, 5 and 10 multiplication and division facts. Mad Minutes are brief and low stakes.
Year 3	Count in 4s, 8s, 50s and 100s; find 10 or 100 more or less.	Use place value and known facts for mental addition and subtraction; connect arrays, grouping and sharing.	Secure 2, 5 and 10 facts; learn 3, 4 and 8 facts; derive related division facts; complements to 100.
Year 4	Count in 6s, 7s, 9s, 25s and 1000s; count backwards through zero.	Select efficient mental or written methods; use factor pairs, distributive law and place-value relationships.	Automatic recall of multiplication and division facts to 12×12 ; complements to 1000 and related decimal facts.
Year 5	Count in powers of 10; count forwards and backwards with positive and negative numbers.	Apply facts to larger numbers and decimals; estimate and use inverse operations to check.	Maintain all multiplication facts; derive facts involving multiples and powers of 10; strengthen fraction-decimal-percentage links.
Year 6	Use flexible intervals including positive and negative numbers and decimal or fractional sequences.	Choose efficient mental and written methods in multi-step contexts; apply order of operations and estimation.	Rapid, accurate recall supports fractions, ratio, percentages and algebra. Practice targets individual gaps and maintains previously learned facts.

Progression in manipulatives and visual representations

Phase	Core resources and images	What pupils learn to do	Teacher emphasis
Nursery	Real objects, fingers, songs, dot patterns, small collections, containers, blocks, inset puzzles and everyday measures.	Match one number word to one object; recognise small quantities; compare groups; explore shape, space, pattern and measures through play.	Model language, draw attention to quantity and structure, and offer repeated experiences in meaningful contexts.
Reception	Five and ten frames, counters, fingers, cubes, bead strings, number tracks, part-whole images, shape and measure resources.	Subitise, compose and decompose numbers to 10, compare quantities, represent problems and connect images to numerals and symbols.	Make links explicit and encourage children to explain what each object or image represents.
Years 1 and 2	Ten frames, rekenrek or bead strings, counters, cubes, Numicon, part-whole models, bar models, number lines, base-10, coins and clocks.	Move between concrete, pictorial and symbolic forms; represent tens and ones; explain addition, subtraction, grouping and sharing.	Use the visual calculation policy consistently and avoid removing resources before conceptual understanding is secure.
Years 3 and 4	Base-10 and place-value counters, arrays, bar models, number lines, fraction strips, clocks, measuring tools, grids and angle resources.	Select and compare representations; expose place value, exchange, multiplicative structure, equivalence and measure.	Connect each resource to equations and increasingly efficient mental or written methods.
Years 5 and 6	Place-value counters including decimals, area models, ratio tables, double number lines, fraction and percentage models, coordinate grids and algebraic representations.	Choose a representation strategically to test, justify and generalise; move fluently between forms.	Reduce routine scaffolds when secure while retaining representations that deepen reasoning or remove an access barrier.

Place value

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Recognise and compare small quantities; count with one-to-one correspondence; link numerals and amounts to 5; understand that the final number tells how many.	Real objects, fingers, dot patterns, five frames, number songs.	amount, count, few, fewer, forwards, how many, more, number, numeral, same, subitise
Reception	Represent and compare numbers to 10; recognise zero; count beyond 20; explore composition, ordering and patterns in the counting system.	Five and ten frames, counters, fingers, number tracks, part-whole models.	after, before, different, represent, zero
Year 1	Count, read, write, represent, compare and order numbers to 100; identify one more and one less; understand tens and ones.	Objects, ten frames, bead strings, base-10, place-value charts and number lines.	compare, count on, digit, greater than, less than, order, partition, tens, ones, ordinal
Year 2	Recognise tens and ones; flexibly partition two-digit numbers; compare and order to 100; locate and estimate on number lines.	Base-10, place-value counters, charts, number lines and partitioning.	exchange, interval, least, multiple, value
Year 3	Represent and compare numbers to 1000; understand hundreds, tens and ones; find 10 or 100 more or less; round to 10 or 100.	Base-10, place-value counters, charts and number lines.	ascending, descending, hundreds, part, whole
Year 4	Read, write, order and compare beyond 1000; understand four-digit place value; round to 10, 100 and 1000; use Roman numerals and negative numbers.	Place-value counters, charts, number lines and scaling.	placeholder, Roman numeral, round, thousands
Year 5	Read, write, order and compare to 1,000,000; use powers of 10; round to required powers; interpret negative numbers.	Place-value charts/counters, number lines and powers-of-10 scaling.	integer, negative number, millions, power of 10, ten thousand
Year 6	Read, write, order and compare to 10,000,000; round to required accuracy; calculate intervals across zero.	Flexible number lines, place-value charts and contextual scales.	ten million, degree of accuracy, interval

Addition and subtraction

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Notice changes in small quantities; combine and separate objects in play; use more, fewer and same.	Objects, fingers, songs, stories and small-world play.	more, fewer, same, altogether
Reception	Explore addition and subtraction through composition; find one more and one less; recall bonds to 5 and some to 10.	Five/ten frames, counters, fingers, part-whole stories.	1 more, 1 less, add, altogether, part, take away, whole
Year 1	Read and use +, - and =; calculate within 20; use number bonds; add and subtract one- and two-digit numbers within appropriate ranges.	Part-whole models, ten frames, bead strings and number lines.	addition, subtraction, difference, double, equal, fact family, inverse, minus, plus, total
Year 2	Secure facts within 20; derive related facts to 100; add and subtract two-digit numbers using mental and written representations.	Base-10, place-value charts, number lines and bar models.	calculation, exchange, operation, partition, related facts, sum
Year 3	Mentally add and subtract ones, tens and hundreds; use column methods for up to three digits; estimate and check.	Base-10/place-value counters linked to expanded and compact methods.	column addition, column subtraction, estimate, exchange, inverse
Year 4	Use efficient mental methods and formal written addition/subtraction with up to four digits; solve two-step problems.	Place-value counters, bar models and compact algorithms.	efficient, estimate, operation, inverse
Year 5	Add and subtract whole numbers with more than four digits and decimals in context; solve multi-step problems and check with rounding.	Place-value charts/counters including decimals; bar models.	decimal place, approximate, multi-step
Year 6	Calculate fluently with whole numbers and decimals; choose efficient methods; solve multi-step problems and use order of operations.	Bar models, equations and abstract methods supported by representations as needed.	order of operations, formula, reasonableness

Multiplication and division

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Make equal and unequal groups; share objects in practical play; notice repeated patterns.	Objects, plates, hoops, rows and songs.	group, share, same, pattern
Reception	Explore equal groups, doubling, sharing and grouping; identify odd and even structures within 10.	Counters, ten frames, arrays and stories.	double, equal groups, odd, even, share
Year 1	Count in 2s, 5s and 10s; make equal groups; use arrays; solve one-step grouping and sharing problems.	Objects, counters, arrays, number lines and bar models.	array, equal groups, grouping, sharing, repeated addition
Year 2	Recall 2, 5 and 10 facts; connect multiplication and division; use commutativity and arrays.	Arrays, equal-group diagrams, number lines and bar models.	commutative, divide, multiplication, times table
Year 3	Recall 3, 4 and 8 facts; multiply two digits by one digit; divide with remainders in context.	Arrays, partitioning, place-value counters and bar models.	factor, product, quotient, remainder, multiple
Year 4	Recall facts to 12×12 ; use factor pairs; multiply two/three digits by one digit and divide appropriately.	Arrays, area models, place-value counters and written methods.	factor pair, distributive, dividend, divisor
Year 5	Identify multiples, factors, primes, squares and cubes; multiply up to four digits by one/two digits; divide up to four digits by one digit.	Area models, place-value counters, factor diagrams and compact methods.	prime, composite, square, cube, common factor
Year 6	Use long multiplication and short/long division; interpret remainders; use common factors/multiples and order of operations.	Area models, equations, factor structures and abstract algorithms.	common multiple, common factor, long division, long multiplication

Fractions, decimals and percentages

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Share fairly and notice parts and wholes in everyday contexts.	Food, objects, shapes and sharing stories.	part, whole, share, half
Reception	Explore equal parts through halving and sharing; connect doubles and halves.	Objects, shapes, ten frames and stories.	equal, half, whole, share
Year 1	Recognise, find and name halves and quarters of objects, shapes and quantities.	Folding, fraction shapes, objects, bar models and number lines.	half, quarter, equal parts
Year 2	Recognise and find thirds, quarters, halves and two quarters; understand unit/non-unit fractions and simple equivalence.	Fraction strips, bar models, shapes and number lines.	third, numerator, denominator, unit fraction, non-unit fraction
Year 3	Count in tenths; recognise, compare, order and add/subtract fractions with the same denominator; find fractions of quantities.	Fraction strips, bars and number lines.	tenth, equivalent, numerator, denominator
Year 4	Use hundredths; recognise equivalent fractions; add/subtract same-denominator fractions; connect tenths/hundredths to decimals and divide by 10/100.	Fraction walls, place-value charts, grids and number lines.	hundredth, decimal, equivalent, decimal place
Year 5	Compare/order fractions; convert mixed/improper fractions; add/subtract related denominators; multiply fractions by integers; use decimals to 3 places and percentages.	Fraction bars, number lines, grids and place-value charts.	mixed number, improper fraction, percentage, thousandth
Year 6	Simplify, compare and calculate with fractions; divide fractions by integers; multiply simple pairs; use decimal/percentage equivalence and solve problems.	Bar models, ratio tables, number lines and abstract calculation.	simplify, common denominator, equivalent percentage

Ratio, proportion and algebra

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Copy and continue simple patterns; notice relationships in repeated actions and objects.	Objects, movements, sounds and pattern strips.	pattern, repeat, same, different
Reception	Continue, create and correct repeating patterns; describe the pattern unit.	Objects, shapes, sounds and visual patterns.	repeat, pattern unit, sequence
Year 1	Describe simple patterns and use missing-number ideas within number facts.	Objects, number tracks and part-whole models.	pattern, missing number, equal
Year 2	Use inverse relationships and simple missing-number equations; scale through 2, 5 and 10 facts.	Bar models, arrays and equations.	inverse, commutative, scale
Year 3	Solve scaling and correspondence problems; use fact families and missing numbers.	Bar models, tables and arrays.	correspondence, scale, equation
Year 4	Use multiplicative comparison and integer scaling; express unknowns in equations.	Bar models, tables and equations.	multiplicative, formula, unknown
Year 5	Solve scaling and simple rate problems; identify rules and use simple formulae or missing-number statements.	Tables, double number lines and equations.	rate, relationship, variable
Year 6	Use ratio language and notation; solve proportion, scale-factor and percentage problems; use formulae, sequences and equations with unknowns.	Ratio tables, double number lines, bar models and algebraic notation.	ratio, proportion, scale factor, variable, expression, equation

Measurement

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Compare size, length, weight and capacity; sequence familiar events; explore filling and emptying.	Everyday objects, containers, balance scales and routines.	big, small, long, short, heavy, light, full, empty
Reception	Compare length, height, mass, capacity and time; use everyday language and begin direct measurement.	Non-standard units, containers, scales, clocks and calendars.	longer, shorter, taller, heavier, lighter, capacity, before, after
Year 1	Measure and compare length/height, mass, capacity and time; recognise coins; tell time to hour/half hour.	Rulers, cubes, scales, containers, coins and clocks.	length, height, mass, capacity, hour, half past
Year 2	Use standard units; compare/order measures; use £ and p; tell time to 5 minutes; know key time facts.	Rulers/metre sticks, scales, jugs, coins, clocks and timelines.	centimetre, metre, gram, kilogram, litre, millilitre, quarter past/to
Year 3	Measure, compare, add and subtract lengths, mass and volume; use money; tell time to minute; measure perimeter.	Measuring tools, scales, clocks, coins and grids.	millimetre, kilometre, perimeter, duration, change
Year 4	Convert common units; solve money/time problems; calculate perimeter and area of rectilinear shapes.	Conversion tables, clocks, grids and measuring tools.	convert, rectilinear, area, square unit
Year 5	Convert metric units and approximate imperial measures; calculate perimeter/area; estimate volume/capacity; use timetables.	Conversion charts, grids, formulae, cubes and timetables.	imperial, metric, volume, cubic unit, timetable
Year 6	Convert measures including miles/km; use decimal notation; calculate area of triangles/parallelograms and volume of cuboids.	Formulae, grids, nets, cubes and conversion relationships.	parallelogram, cubic centimetre, formula, conversion

Geometry – shape, angles and position

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Explore, compare and combine 2D and 3D shapes; fit shapes into spaces; use positional language in play.	Blocks, puzzles, construction, routes and small-world play.	shape, side, corner, round, flat, in, under, behind
Reception	Select, rotate and manipulate shapes; compose/decompose shapes; describe positions, routes and spatial relationships.	Pattern blocks, tangrams, construction, maps and obstacle routes.	rotate, turn, beside, between, in front, behind
Year 1	Recognise and name common 2D/3D shapes; describe position, direction and whole/half/quarter turns.	Real shapes, sorting, construction and movement grids.	vertex, edge, face, position, direction, turn
Year 2	Identify properties including sides, vertices, edges and faces; recognise symmetry; use clockwise turns.	Shape sets, mirrors, geoboards and grids.	vertical, horizontal, symmetry, clockwise, anti-clockwise
Year 3	Recognise right angles and other angles; identify parallel/perpendicular lines; draw 2D shapes and make 3D shapes.	Angle testers, rulers, geoboards and construction materials.	right angle, acute, obtuse, parallel, perpendicular
Year 4	Classify triangles and quadrilaterals; compare/order angles; identify symmetry; plot and translate in the first quadrant.	Protractors as comparison tools, mirrors and coordinate grids.	quadrilateral, polygon, coordinate, translation
Year 5	Measure/draw angles; calculate around a point/line; use properties of rectangles; translate and reflect shapes.	Protractors, rulers and coordinate grids.	degrees, reflex, regular, irregular, reflection
Year 6	Use angle facts in triangles, quadrilaterals and polygons; describe circles; construct shapes and use all four quadrants.	Protractors, compasses, nets and coordinate grids.	radius, diameter, circumference, vertically opposite, quadrant

Statistics

The table summarises the development of the strand. Vocabulary is introduced at the stated stage and deliberately revisited thereafter.

Year group	Key knowledge and development	Useful representations and scaffolds	Vocabulary emphasis
Nursery	Sort and compare objects and discuss what is the same or different.	Objects, simple sorting circles and picture collections.	sort, same, different, more, fewer
Reception	Sort, match and compare information in meaningful contexts; discuss simple class data.	Objects, pictures and simple group charts.	group, match, compare
Year 1	Answer questions by sorting, counting and comparing objects or simple pictorial information.	Lists, simple tables and pictograms with concrete objects.	data, table, pictogram
Year 2	Interpret and construct tally charts, tables, block diagrams and pictograms; ask and answer comparison questions.	Tally charts, tables, block diagrams and pictograms.	tally, category, block diagram, key
Year 3	Interpret and present data using bar charts, pictograms and tables; solve one- and two-step questions.	Scaled pictograms, bar charts and tables.	scale, axis, bar chart, frequency
Year 4	Interpret and present discrete and continuous data; use time graphs; compare sums and differences.	Bar charts, tables and time graphs.	continuous, discrete, time graph
Year 5	Solve comparison, sum and difference problems using line graphs; read and complete timetables.	Line graphs, tables and timetables.	line graph, interval, trend
Year 6	Interpret and construct pie charts and line graphs; calculate and interpret the mean.	Pie charts, line graphs and data tables.	pie chart, mean, average, proportion

Year-group overview

Year group	Curriculum emphasis	Fluency and number facts	Representations and teaching emphasis	Evidence of impact
Nursery	Comparison, counting, cardinality, spatial awareness, shape, pattern and measures through play and routines.	Subitise to 3; count and link amounts to 5; compare more/fewer/same; explore AB patterns; compare size, length, weight and capacity.	Objects, songs, stories, blocks, containers, puzzles and mark making. Adults model vocabulary and notice mathematics in play.	Observation, talk, practical response and application in provision.
Reception	Deep understanding of number to 10; counting beyond 20; composition, subitising, comparison and numerical patterns.	Bonds to 5 and some to 10; doubles within 10; one more/less; equal groups, sharing and halving.	Five/ten frames, counters, fingers, number tracks, part-whole images, stories and rhymes.	Observation, explanations, practical tasks and independent application across provision.
Year 1	Place value to 100; addition/subtraction within 20; early multiplication/division; halves/quarters; measure, shape and position.	Bonds within 10 and 20; count in 2s, 5s and 10s; doubles and near doubles.	Ten frames, rekenrek/bead strings, counters, part-whole and bar models, number lines and base-10.	Daily checks, pupil talk, independent work and low-stakes fact retrieval.
Year 2	Place value to 100; secure additive strategies; 2, 5 and 10 facts; thirds/quarters; standard measures, time, money, shape and data.	Automatic facts within 20; complements to 100 in tens; multiplication/division facts for 2, 5 and 10.	Base-10, place-value charts, arrays, bar models, number lines, clocks, coins and measures.	Accuracy, strategy choice, explanations and end-of-block assessment.
Year 3	Place value to 1000; formal addition/subtraction; 3, 4 and 8 facts; early formal multiplication/division; fractions, measure, angles and data.	All prior tables plus 3, 4 and 8; complements to 100; mental addition/subtraction using place value.	Place-value counters, arrays, bar models, fraction strips, number lines and measuring tools.	Fluency, representation, reasoning, problem solving and retention over time.
Year 4	Place value to 10,000; four operations; all times tables; equivalent fractions/decimals; area/perimeter, angles, coordinates and graphs.	Automatic multiplication/division to 12×12 ; complements to 1000; derived decimal facts.	Place-value counters, compact methods, fraction walls, grids, bar models and coordinate resources.	Multiplication Tables Check readiness alongside broad mathematical understanding.
Year 5	Place value to 1,000,000; larger-number calculation; fractions/decimals/percentages; measures, area/volume, angles and line graphs.	Maintain all multiplication facts; derive related facts using powers of 10; secure fraction-decimal-percentage connections.	Area models, place-value counters including decimals, bar models, number lines and conversion tables.	Efficiency, justification, multi-step application and diagnosis of remaining gaps.
Year 6	Place value to 10,000,000; fluent four operations; fractions, ratio, percentages and algebra; advanced measure, geometry and statistics.	Flexible recall and calculation support complex problems; targeted retrieval maintains facts and addresses individual gaps.	Ratio tables, double number lines, bar models, algebraic notation, formulae and abstract methods.	Independence, accuracy, reasoning, application, retention and readiness for Key Stage 3.

Appendices

These NCETM materials support assessment for mastery and the systematic development of mathematical reasoning. Select a title to open the full source document. Staff should use them alongside the White Rose sequence, the Shawclough lesson approach and ongoing assessment.

Appendix A NCETM mastery assessment materials

The Year 1 to Year 6 materials provide questions, tasks and activities that help teachers assess depth of understanding, fluency, reasoning and application.

Year group	Linked NCETM document
Year 1	Year 1 Mastery assessment questions and tasks
Year 2	Year 2 Mastery assessment questions and tasks
Year 3	Year 3 Mastery assessment questions and tasks
Year 4	Year 4 Mastery assessment questions and tasks
Year 5	Year 5 Mastery assessment questions and tasks
Year 6	Year 6 Mastery assessment questions and tasks

Appendix B NCETM reasoning progression maps

These maps show how reasoning develops across mathematical domains. They should inform questioning, sentence stems, representations, worked examples and problem design within each unit.

Mathematical domain	Linked NCETM document
Number and place value	Open number and place value reasoning progression map
Addition and subtraction	Open addition and subtraction reasoning progression map
Multiplication and division	Open multiplication and division reasoning progression map
Fractions	Open fractions reasoning progression map
Ratio and proportion	Open ratio and proportion reasoning progression map
Algebra	Open algebra reasoning progression map
Measurement	Open measurement reasoning progression map
Geometry properties of shapes	Open geometry properties of shapes reasoning progression map
Geometry position direction and movement	Open geometry position direction and movement reasoning progression map
Statistics	Open statistics reasoning progression map