Maths skills overview and progression chart- Year 6

Y 6	Number – number & place value	Number – addition, subtraction, multiplication & division	Number – fractions, decimals & %	Measurement	Geometry – properties of shapes	Geometry – Position & direction	Statistics	Ratio & Proportion	Algebra
Focus/ Key facts	up to 10 million Negatives multiply and divide decimals by 0,100,1000 giving answers to 3dp	Up to 6 digits 3dp X -4 by 2 digits Division – 4 by 2 BODMAS	denominators up to 100 multiply simple pairs of proper fractions (1/4 x 1/2 = 1/8) Divide proper fractions by whole numbers (1/3 ÷ 2 = 1/6) multiply 2 whole numbers by decimals with 2dp Divide where answers will has up to 2dp	**Conversions-** metric and imperial **Perimeter:** composite rectilinear shapes **Area**: rectangle and irregular shapes. **Volume:** calculate cm^3 **Time:** mix of units	**2d: draw and classify** regular & irregular polygons **3d: make and recognise p**olyhedron Id from net. **Draw & measure:** to nearest mm / degree. **Find unknown** angles/side **Name parts of a circle**	4 quadrants Equal and unequal scales on both axis	Line graphs with 2 variable Pie charts Average Km /miles graph	**<u>NEW STRAND</u>** recognise proportionality in context (i.e. recipes) link % or 360° to pie charts	**<u>NEW STRAND</u>** symbols & letters to represent variables & unknowns Formulae in maths & science.
Key	Partitioning	column addition /subtraction / multiplication (condensed) Bus stop/ long division	Bar model: emphasise link to division (2/5 = 2 ÷ 5 = 0.4)	X ÷ 10,100,1000 for conversions.			Time graphs, Bar and line graphs, Timetable	notion of a:b bar model	Simple formula with links to familiar context.
Representatio	Partition Part whole models Bar model Number line Base Ten Place value counters Missing numbers		Bar model Missing numbers Part whole models Number line Cuisenaire rods Shape Objects	Rectilinear shapes Irregular shapes Horizontal, vertical and circular scales, Timetable/ Calendar Analogue /digital, number line	2d and 3d, Nets Drawings	2 quadrants Reflection, rotation and translation	bar /line graph, table, tally chart, pictogram, Venn, Carroll continuous/ discrete	Pie chart notion of a:b bar model recipes	Missing angles, coordinates patterns equivalents a+b=b+a;

Mental maths	Number – number & place value	Number –addition, subtraction, multiplication, division	Number – fractions, decimals & %	Measurement	Geometry – properties of shapes
	multiply or divide any given number by 0.01, 0.1, 10, 100, 1000, Negative: count forwards/backwards over zero Round to nearest 100,1000, 10000	Add/ subtract 2dp numbers Add/subtract multiple of 10,100,1000,10000 Use known facts, including multiples and factor pairs to multiply/ divide (3 x 5 = 15 so 300 x 5 = 1500; Half/ doubling: 438 ÷ 6 = 219 ÷ 3 multiply or divide any given number by 10,100,1000,	¼ of 100 = x 25 _ 28 x 25 =¼ of 28 x 100 = 700 Fractions of amounts	Work out time difference between given times (to 1 minutes) (analogue and digital add and subtract multiple amounts of money. Convert between metric units (x ÷10,100,1000)	Name and properties of 2D and 3D shapes Missing angles/side

Yr 6 Vocabulary

Number – number & place value	**Number – addition, subtraction**	**Number - multiplication & division**	**Number – fractions, decimals & %**	**Measurement**	**Geometry – properties of shapes**	**Geometry – Position & direction**	**Statistics**	**Ratio & Proportion**	**Algebra**
< > , partition place value, recombine, cardinal/ordinal numbers, consecutive, rounding, thousands, tenths, hundredths, decimal, round to nearest .., negative integer, through zero, roman numerals (I to C) powers of 10, thousandths, ascending, descending equation, integer, Roman Numeral to 1000(M) *digital root, gross, composite numbers, score*	add, more, plus, make, sum, total, altogether, Column addition, exchange, commutative, addend subtract, minus, take away, fewer, difference, less, Column subtraction, inverse, efficient Compensate Approximate *order of operations (BODMAS), common factors, common multiplies*	product, times, multiple , multiply, repeated addition, lots, groups of, double, array, commutative share, group, divide, equal, repeated subtraction, remainder, left over, half factor, quotient, efficient, inverse, derive, short division (bus stop) factor pairs, composite/ prime/prime factors/square/cubed /triangular fact boxes inverse, distributive equivalence	Numerator, denominator, Unit fraction, non-unit fraction, Compare, whole, half to twelfths, equivalent, equal tenths, hundredths, decimal equivalent, common denominator, simplify proper, improper mixed numbers, percentages, ratio, expressing proportion. % and decimal equivalents *simplify*	capacity, length, am/pm, 12 hour/24 hour, morning, afternoon, midnight, noon, half past, quarter past, seconds ,o'clock, minutes, hours, day, months, Leap year, scales, weight, perimeter, heavier/lighter, mm/cm/m, m/km, g/kg, ml/l, £/p, Roman numerals (13-100); convert, area, width, estimate, decimal volume, imperial: inches, pounds, pints breadth, dimensions, volume cm3, composite rectilinear shapes *mile/km conversion formulae*	angle, face, vertices, clockwise, anti-clockwise, full/ half/quarter turn, degrees, right angle, acute, obtuse, horizontal, vertical, perpendicular, parallel regular, irregular, adjacent, bisect, diagonal, line of symmetry orientation, all quadrilateral all triangles congruent, reflex, interior /exterior angles, dodecagon, intersect, polyhedron *circumference, radius, diameter, base angles*	polygon, plot , coordinatestranslation, quadrant, x-axis, y-axis, tessellation, origin, integer labels reflection, dimensions, rotational symmetry , *four quadrants , co-ordinate plane, origin,*	tally, vote, graph, title, label, common, popular, pictogram, represent, sort, chart, bar chart, frequency table, Axis, continuous data , line graph, Carroll, Venn diagrams, x y axis discrete, Time graph *average, median, mode, mean, pie chart, construct, degree of accuracy, 2 variables, mile to km*	*ratio and proportion, pie charts, a:b*	*algebra, formulae, linear number sequence, substitute, variables, symbol, known value*

Year 6 NC objectives (linked to progression maps)

Number – number and place value	**Number – addition and subtraction**	**Number – multiplication and division**	**Number – fractions**	**Measurement**	**Geometry – properties of shapes**	**Geometry – Position & direction**	**Statistics**	**Ratio & proportion**	**Algebra**
COUNTING use negative numbers in context, and calculate intervals across zero COMPARING read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (Also appears in Reading and Writing Numbers) IDENTIFY, REPRESENT, ESTIMATE - READ & WRITE read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (also appears in Understanding Place Value)	MENTAL CALCULATIONS perform mental calculations, including with mixed operations and large numbers use their knowledge of the order of operations to carry out calculations involving the four operations WRITTEN METHODS - INVERSE, ESTIMATE, CHECK use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.	MULTIPLICATION & DIVISION FACTS - MENTAL CALCULATIONS perform mental calculations, including with mixed operations and large numbers *associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$)* (copied from Fractions) WRITTEN METHODS 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 short division where appropriate for the context 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	COUNTING - RECOGNISE COMPARE compare and order fractions, including fractions >1 COMPARE DECIMALS identify the value of each digit in numbers given to three decimal places ROUNDING solve problems which require answers to be rounded to specified degrees of accuracy (also in problem solving)	COMPARE AND ESTIMATE 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. MEASURE & CALCULATE solve problems involving the calculation and conversion of **units of measure**, using decimal notation up to three decimal places where appropriate (appears also in Converting) recognise that shapes with the same areas can have different **perimeters** and vice versa	IDENTIFY SHAPES AND PROPERTIES recognise, describe and build simple 3-D shapes, including making nets (appears also in Drawing and Constructing) illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius DRAW & CONSTRUCT draw 2-D shapes using given dimensions and angles recognise, describe and build simple 3-D shapes, including making nets (Also appears in Identifying Shapes and Their Properties)	POSITION & DIRECTION 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.	INTERPRET, CONSTRUCT & PRESENT interpret and construct pie charts and line graphs and use these to solve problems (Also in problem solving) PROBLEM SOLVING interpret and construct pie charts and line graphs and use these to solve problems (also in constructing)	solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison solve problems involving similar shapes where the scale factor is known or can be found solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. (ALL above also in problem solving)	EQUATIONS express missing number problems algebraically find pairs of numbers that satisfy number sentences involving two unknowns enumerate all possibilities of combinations of two variables FORMULAE use simple formulae *recognise when it is possible to use **formulae** for area and volume of shapes* (copied from Measurement) SEQUENCES generate and describe linear number sequences

Number – number and place value	**Number – addition and subtraction**	**Number – multiplication and division**	**Number – fractions**	**Measurement**	**Geometry – properties of shapes**
UNDERSTAND PLACE VALUE read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers) *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* (copied from Fractions) ROUNDING round any whole number to a required degree of accuracy *solve problems which require answers to be rounded to specified degrees of accuracy* (copied from Fractions)		PROPERTIES OF NUMBER identify common factors, common multiples and prime numbers *use common factors to simplify fractions; use common multiples to express fractions in the same denomination* (copied from Fractions) *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* (copied from Measure) BODMAS use their knowledge of the order of operations to carry out calculations involving the four operations INVERSE, ESTIMATE & CHECK use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy *use written division methods in cases where the answer has up to two decimal places* (copied from Fractions (including decimals))	EQUIVALENCE use common factors to simplify fractions; use common multiples to express fractions in the same denomination associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$) recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. ADD & SUBTRACT FRACTIONS add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions MULTIPLICATION AND DIVISON OF FRACTIONS multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. $^1/_4 \times {}^1/_2 = {}^1/_8$) multiply one-digit numbers with up to two decimal places by whole numbers divide proper fractions by whole numbers (e.g. $^1/_3 \div 2 = {}^1/_6$) X & DIVISION OF DECIMALS multiply one-digit numbers with up to two decimal places by whole numbers multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places 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 associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$) use written division methods in cases where the answer has up to two decimal places	calculate the area of parallelograms and triangles 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]. recognise when it is possible to use formulae for area and volume of shapes TELLING THE TIME - CONVERTING 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 solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate (appears also in Measuring and Calculating, problems solving) convert between miles and kilometres	COMPARE & CLASSIFY compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons ANGLES recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

PROBEM SOLVING OBJECTIVES

N**umber – number and place value**	**Number – addition and subtraction**	**Number – multiplication and division**	**Number – fractions**	**Measurement**	**Statistics**	**Ratio & Proportion**
solve number and practical problems that involve all of the above	solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Solve problems involving addition, subtraction, multiplication and division	solve problems involving addition, subtraction, multiplication and division *solve problems involving similar shapes where the scale factor is known or can be found* (copied from Ratio and Proportion)	solve problems which require answers to be rounded to specified degrees of accuracy (also in rounding)	solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate (appears also in Measuring and Calculating, converting)	interpret and construct pie charts and line graphs and use these to solve problems (Also in interpret and construct)	solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison solve problems involving similar shapes where the scale factor is known or can be found solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
Missing numbers/ information Odd one out True/false Explain how (give a reason then prove it)			How many more/less Use different representations Use less familiar vocabulary How do you know it is wrong? 2/3 step problems Extra (not relevant) info			

Problem Solving Yr 6

NRICH Problems

Number – number and place value	Number – addition and subtraction	Number – fractions	Measurement	Geometry – properties of shapes	Geometry – Position & direction	Statistics	Ratio & proportion	Algebra
Round the Four Dice * Number Lines in Disguise **	Planning a School Trip * Always, Sometimes or Never? Number *	More Fraction Bars ** Extended Fraction Bars ** Doughnut Percents ** Fraction Lengths ** Would You Rather? *	Next Size Up **	Making Cuboids ** Cut Nets ** Baravelle ** Making Spirals *** Shape Draw * Sponge Sections ** Quadrilaterals *** Where Are They? * Triangles All Around (I) *** Round a Hexagon * Always, Sometimes or Never? Shape * Name That Triangle! *	Ten Hidden Squares *** Treasure Hunt (I) *	Match the Matches ** Birdwatch *	Pumpkin Pie Problem ** Rectangle Tangle * Orange Drink ** Fraction Fascination *** Jumping *	Two and Two *** Plenty of Pens * Different Deductions ** Price Match ** Doplication * Diagonal Sums ** Finding 3D Stacks *** Break it Up! * Holes * Button-up Some More ** Domino Sets *

Other resources

White Rose maths RPS
Third space learning
Twinkl challenges
Testbase

(WODNB) WhIch One Does not Belong: https://wodb.ca/numbers.html