

CURRICULUM ROADMAP - Nursery to Year 13

Mathematics

KEY:
■ Pure
■ Applied

Graphs of trigonometric functions
Equation of a circle; transformations of graphs; algebraic proof; algebraic fractions; iteration; vectors

Grouped frequency tables; stem-and-leaf diagrams; frequency polygons; cumulative frequency; box plots; histograms
Volume and surface area of a prism, cylinder, pyramid, cone and sphere; area and volume of similar shapes; congruency

Use equations to solve direct and inverse proportion problems
Converting recurring decimals to fractions; negative and fractional powers; surds
Significant points of quadratic graphs; graphs of non-linear simultaneous equations; quadratic formula; completing the square; quadratic inequalities; graphs of inequalities

Factorise and solve quadratics; solve simultaneous equations
Area and circumference of circles; arc length, perimeter and area of sectors; exact answers; Pythagoras' theorem; trigonometry for right-angled triangles

Probability tree diagrams
Percentages of amounts; percentage increase and decrease; compound interest; reverse percentage change; standard form for large and small numbers; error intervals

Converting between fractions and mixed numbers; converting between fractions, decimals and percentages; find percentages of amounts; percentage increase and decrease; compound interest; reverse percentage change
Simplifying ratio; share an amount in a ratio; convert a ratio to a fraction; write a ratio in the form 1:n; combining two ratios; changing ratios; direct proportion; inverse proportion; unitary method; compound measures including speed, pressure and density

Draw & measure angles; use angle facts; form equations using angle facts; angles in polygons; area of 2D shapes including circles; vocabulary of circles; circumference of a circle; vocabulary of 3D shapes; volume & surface area of cuboids, prisms & cylinders; converting units of area & volume
The probability scale; probability of an event not happening; mutually exclusive events; exhaustive outcomes; probability diagrams

Using decimals; estimation
Generate sequences; recognise different types of sequences; find rules to describe sequences; form and solve linear equations; plot straight line graphs; find gradients, intercepts and equations of straight line graphs; recognise and find parallel lines
Share in a given ratio; rates of change
Transformations of 2D shapes

Classifying shapes; interior angles of triangles; constructions; symmetry; tessellation
Equivalent fractions; converting between mixed numbers and improper fractions; converting between fractions and decimals and percentages; finding percentages of amounts; express amounts as percentages; percentage increase and decrease
Ratio notation; equivalent ratio; sharing in a ratio

Convert units [length/mass/volume/time] from smaller to larger up to 3dp
Find unknown angles in triangles/quads/regs polygons; recognise angles round a point/straight line/vert opp; coords on 4quads; translation; reflection

Numbers up to 10,000,000; round any number; neg. no.s across zero
Factors/multiples/primes; mixed operations
TH10T0 x TO (formal); TH10T0 ÷ TO (formal); remainders as fractions; order of operations
x/- by 10,100,1000 up to 3dp; compare/order; dec./fra equivalents; simplify fractions; +/- with diff denom & mixed no.s; x fractions e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ = fractions by integers e.g. $\frac{1}{2} \div 2 = \frac{1}{4}$

Formally multiply TH10T0xTO (or Oa); formally divide TH10T0÷O using short division
Equival; decimals as fr e.g. $0.71 = \frac{71}{100}$ % as parts/100; % as decimals; link 1000ths to 10ths/100ths; mixed no.s/improper fr convert; +/- fractions writing answers >1 as mixed no.s; Compare/order +/- fractions with denoms that are multiples of each other; multiply proper fractions & mixed no.s by integers solve problems inv no.s up to 3dp requiring knowledge of %/dec equivs of $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{10}$ and fractions with a denom of a multiple of 10 or 25

+/- fractions with same denom; round 1dp decimals to n. whole no.s; compare no.s with same decimal places up to 2dp; solve problems; divide quantities & link to fractions
Solve measure/money problems inv. fra./dec to 2dp; estimate/compare; read/write/convert time between analogue/digital (1/2/24hr); convert hours-mins/mins-sec/years-months/weeks-days
Interpret/present discrete/continuous data on bar charts/time graphs; solve comp./sum./diff probs
Coords in 1st quad; translations as L/R/Up/Down; plot/draw polygons on coord grid; compare/classify shapes [quads/tri]; identify acute/obtuse angles; compare/order angles up to 180°; identify lines of symmetry in 2D shapes in diff orientations; complete a symmetrical figure

Know pv of 4-digit no.s; 1000 more/less; order/compare no.s 1000+; round any number to n. 10,100,1000; count in mults of 6,7,9,25,1000; count back into neg no.s; Roman Numerals to 100
+/- no.s up to 4-digits using formal method; use inverse ops; solve problems
Recall all tables to 12x12; x0, x1, -1, 0x0x0; factor pairs; use commutativity
Convert between kilometres/metres; measure/calc perim of rect/squares by counting squares

Perimeter of simple 2D shapes; +/- amounts of money; give change; use £ and p in contexts
Write/calculate statements for x/- mentally progressing to formal methods solve missing no. problems
Count in tenths; link to ~10; recognise/find/write fractions of a set of objects unit & non-unit fractions with small denoms; recognise & use fractions as numbers unit/non-unit; use diagrams to show equivs

Continued from Spring
Compare/sequence intervals of time; tell/write time to 5 mins incl. quarter past/to hour; know number of minutes in an hour and hours in a day
Interpret/construct pictograms/tally charts/block diagrams/tables; ask/answer problems
Order/arrange objects in patterns/sequences; describe position/direction/movement in a straight line; rotation as turns: right-angles (quarter/half/three-quarter turns); clockwise/anticlockwise vocab

Count in 2s/3s/5s/10s; recognise Ten's/Ones; place no.s on a no. line; compare/order up to 100; use <, > and = signs; read/write no.s on to at least 100 in numerals/words
Apply mental/written methods; use +/- facts to 20 fluently; use related facts up to 100; TO+O; TO+10s; TO+100; O+O+O; commutativity; inverse to solve missing number problems
Properties of 2D shapes (sides/symmetry); 3D shapes (edges/vertices/faces); identify 2D shapes on the faces of 3D shapes

Within 50; multiples of 2, 5 & 10 included; count, read & write numbers to 100 in numerals; count in multiples of 2s, 5s & 10s
Know number bonds to 20 (and related subtraction facts); add/subtract 1-digit & 2-digit numbers to 20; solve 1-step problems involving +/- using concrete and pictorial representations and missing number problems such as $7 + \square = 9$
Solve length/height/mass/weight/capacity/volume problems; measure & compare; tell time to hour & half past; use language: hours/minutes/seconds/days of week/months/years; sequence

Counting & recognition; exploring teen numbers. Count verbally beyond 20, recognising the pattern of the number system. Compare numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Take away; what is left? Fewer/less than; counting on/back, doubling/halving, sharing
Number bonds to 10; solve simple problems through simple addition and subtraction
Recognise 3D shapes; properties of/ classify and sort 2D and 3D shapes
Capacity (full/empty/half/full)
Money (recognition of coins/notes)
Measuring with non-standard units of measure
Introduction to tally charts and pictograms

Securing pre-counting skills; number recognition; subitising to 5
Principles of early number (one-to-one, stable order, cardinal, abstraction, order irrelevance)
Comparing number in different contexts, recognising when one quantity is greater than/less than/ the same/equal to another quantity
Finding the total by counting; number bonds to 3, 4 and 5; automatic recall of number bonds to 5
Recognise 2D shapes
Seasons, days of the week, months of the year
Noticing & finding patterns; repeating patterns; matching, sorting and comparing

Numbers to 10; numerals; counting out objects; sequencing numbers
Shape recognition within pictures/contexts (shape in the environment); positional language
Sequencing (baby to adult); length; tallest/shortest

Year 13 (SUM)
Pure Proof; numerical methods; trapezium rule
Applied Moments in equilibrium; centres of mass; ladders

Year 13 (SPR)
Pure Further differentiation and integration; coordinate geometry with circles; arcs and sectors; parametric equations
Applied Sampling; large data set; standard deviation; cumulative frequency; histograms; regression; correlation; hypothesis testing; probability; forces

Year 13 (AUT)
Pure Trigonometry in any triangle; trigonometric functions, identities and equations; small angle approximations; reciprocal trigonometric functions; compound and double angle formulae
Applied Using the normal distribution; hypothesis testing with the normal distribution

Year 12 (SUM)
Pure Vectors in 2D and 3D; exponential functions; logarithms
Applied Modelling in mechanics; kinematics with constant acceleration; motion under gravity; variable acceleration

Year 12 (SPR)
Pure Trigonometry in any triangle; trigonometric functions, identities and equations; small angle approximations; reciprocal trigonometric functions; compound and double angle formulae
Applied Using the normal distribution; hypothesis testing with the normal distribution

Year 12 (AUT)
Pure Basic algebra; solving equations and inequalities; partial fractions; graphs and transformations; introduction to calculus
Applied Statistical distributions; hypothesis testing

Year 11 (SUM)
Pure Exam technique
Applied Revision and recall

Year 11 (SPR)
Pure Graphs of trigonometric functions
Applied Geometry
Equation of a circle; transformations of graphs; algebraic proof; algebraic fractions; iteration; vectors

Year 11 (AUT)
Pure Statistics
Applied Probability of combined events; tree diagrams for dependent and independent events; conditional probability; set notation

Year 10 (SUM)
Pure Know and apply circle theorems to solve problems; proofs of circle theorems; trigonometry in three dimensions; line rule, cosine rule and area of a triangle; loci
Applied Converting recurring decimals to fractions; error intervals; upper and lower bounds; product rule for counting
Function notation; sequences including quadratic sequences

Year 10 (SPR)
Pure Linear graphs; finding the equation of a line between two points; find the equation of a line with a given gradient; parallel and perpendicular graphs; real life graphs; solving equations using graphs; quadratic graphs; cubic and reciprocal graphs
Applied Converting recurring decimals to fractions; negative and fractional powers; surds
Share in a ratio; combining ratios; changing ratios; forming equations from ratio problems; compound measures

Year 10 (AUT)
Pure Generate sequences; find nth term of quadratic sequence; plot linear graphs; find the equation of a linear graph; use conversion graphs; plot quadratic, cubic and reciprocal graphs; solve equations using graphical intersection
Applied Use laws of indices; convert numbers into and out of standard form; calculate with numbers in standard form
Use the probability scale; calculate relative frequency; use two way tables and Venn diagrams; use systematic listing strategies

Year 9 (SUM)
Pure Find side lengths and angles using trigonometry; apply trigonometry to bearings problems; transformations; congruency; similarity
Applied Four operations including negatives; rounding and approximation; factors, multiples, primes, LCM & HCF
Pythagoras' theorem; angles in parallel lines in quadrilaterals; converting units; scale drawings; bearings; ruler and compass constructions; loci; plans and elevations

Year 9 (SPR)
Pure Expanding and factorising with one bracket; expanding two brackets; solve linear equations; changing the subject of a formula
Applied Convert between percentages, decimals and fractions; find percentages of amounts; percentage increase and decrease; repeated percentage change; compound interest; reverse percentages; rounding to significant figures; estimation

Year 9 (AUT)
Pure Find averages and range; compare data sets; find averages from ungrouped frequency tables
Applied Represent inequalities on number lines; find integer solutions to inequalities; form and solve linear inequalities

Year 8 (SUM)
Pure Coordinates in four quadrants including non-integers; finding midpoints; horizontal and vertical lines
Applied Area of triangles, rectangles, parallelograms, trapezia and compound shapes
Indices; prime factorisation; LCM and HCF

Year 8 (SPR)
Pure The four operations; working with negative numbers; factors, multiples and primes
Applied Measuring/drawing/calculating angles (on a line & round a point); angle properties of parallel lines

Year 8 (AUT)
Pure FDP equivs; find % of amounts
Applied Interpret & construct pie charts and line graphs; calc means as an average
Solve problems involving missing values, unequal sharing, scale factors, similar shapes
Calculate areas of triangles/rects/parallelograms; vol of cubes/cuboids
Draw 2D shapes; recognise/build 3D shapes incl. nets; name parts of circle; find diam/radius
Use simple formulae; express missing no. problems algebraically; generate/describe linear no. sequences; find pairs of no.s satisfying no. sent.s inv. two unknowns poss of two variables

Year 7 (SUM)
Pure Read/write/order/compare no.s up to 3dp; round decimals to 2dp to 1dp/integer
Applied Identify 3D shapes from 2D representations; estimate/compare/measure/draw angles; identify acute/obtuse/reflex/round a point/straight line/multiples of 90°; calc missing angles within right-angles; distinguish between regular/irregular polygons; reflect/translate shapes
Convert units of metric measure; use equivs of metric/imperial; estimate volume/capacity

Year 7 (SPR)
Pure Formal T0xHT0; use distributive law to multiply 2-digit numbers by 1-digit
Applied Measure/calc area of rect/squares by counting squares
Count in hundredths; link to ~100 & div tenths by ten; ~10/100 (a 1 or 2-digit no.); know pv of 2dp no.s; know decimal equivs of tenths/hundredths; recognise/show families of equiv fractions; recognise/write decimal equivs to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$

Year 7 (AUT)
Pure +/- fractions with same denom within one whole; compare/order unit fractions with same denom
Applied Measure/compare +/- lengths, mass, volume, capacity; tell 12/24 hr time (analogue); Roman Numerals; read time to nearest minute; vocals o'clock/am/pm/noon/midnight; no. of secs in a minute/days in a month/year/leap year; compare durations of events
Draw 2D shapes; make/recognise 3D shapes in different orientations; recognise angles as a property of a shape; identify right-angles & those greater/less than; horizontal/vertical/perpendicular/parallel lines
Interpret/present data in bar charts/pictograms/tables; solve 1-step & 2-step Qs from them

Year 6 (SUM)
Pure Read/write/compare no.s up to 1000 (numerals/words); pv of 3-digit no.s; count in multiples of 4/8/50/100; find 10 or 100 more/less than a given number
Mentally add HT+O, HTO+10s, HTO+100s; +/- 3-digit no.s using formal methods; use Inverse
Recall & use x/- facts for 3x, 4x and 8x

Year 6 (SPR)
Pure Recognise/use pounds (£) and pence (p); combine amounts to make a particular value; find combinations that equal the same amount; solve practical problems
Recall facts 2x/5x/10x; recognise add/even numbers; use x/- symbols in number sentences; commutativity of x but not + use arrays, repeated addition & facts to solve x/- problems
Estimate/measure length/height in any direction; mass; temp; capacity; compare/order use < > =
Recognise/find/name/write $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$ and $\frac{3}{4}$ of a length/shape/set of objects/quantity; write simple fractions e.g. $\frac{1}{2}$ of 6 = 3; recognise equivalence of two quarters and one half

Year 6 (AUT)
Pure Count to/across 100, forwards/backwards, beginning with 0 or 1 or from any given number
Reinforce multiples of 2, 5 & 10; solve 1-step x/- problems; use arrays
Recognise, find & name a half as 1 of 2 equal parts of an object/shape/quantity
Recognise, find & name a quarter as 1 of 4 equal parts of an object/shape/quantity
Describe position/direction/movement incl. whole, half, quarter & three quarter turns
Money, time

Year 5 (SUM)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Year 5 (SPR)
Pure Counting forwards/backwards (through songs); writing numbers (as/when ready)
Addition/subtraction through more/less/fewer
Introduce money; coin recognition; capacity (full/empty)
Beebots forwards/backwards positional language

Year 5 (AUT)
Pure Sorting; rote counting; 1:1 correspondence; recognition of 0-5; ordering numerals
Introduction to shape
Longest/shortest; sequencing events day/night/time language

Year 4 (SUM)
Pure FDP equivs; find % of amounts
Applied Interpret & construct pie charts and line graphs; calc means as an average
Solve problems involving missing values, unequal sharing, scale factors, similar shapes
Calculate areas of triangles/rects/parallelograms; vol of cubes/cuboids
Draw 2D shapes; recognise/build 3D shapes incl. nets; name parts of circle; find diam/radius
Use simple formulae; express missing no. problems algebraically; generate/describe linear no. sequences; find pairs of no.s satisfying no. sent.s inv. two unknowns poss of two variables

Year 4 (SPR)
Pure Read/write/order/compare no.s up to 3dp; round decimals to 2dp to 1dp/integer
Applied Identify 3D shapes from 2D representations; estimate/compare/measure/draw angles; identify acute/obtuse/reflex/round a point/straight line/multiples of 90°; calc missing angles within right-angles; distinguish between regular/irregular polygons; reflect/translate shapes
Convert units of metric measure; use equivs of metric/imperial; estimate volume/capacity

Year 4 (AUT)
Pure Formal T0xHT0; use distributive law to multiply 2-digit numbers by 1-digit
Applied Measure/calc area of rect/squares by counting squares
Count in hundredths; link to ~100 & div tenths by ten; ~10/100 (a 1 or 2-digit no.); know pv of 2dp no.s; know decimal equivs of tenths/hundredths; recognise/show families of equiv fractions; recognise/write decimal equivs to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$

Year 3 (SUM)
Pure +/- fractions with same denom within one whole; compare/order unit fractions with same denom
Applied Measure/compare +/- lengths, mass, volume, capacity; tell 12/24 hr time (analogue); Roman Numerals; read time to nearest minute; vocals o'clock/am/pm/noon/midnight; no. of secs in a minute/days in a month/year/leap year; compare durations of events
Draw 2D shapes; make/recognise 3D shapes in different orientations; recognise angles as a property of a shape; identify right-angles & those greater/less than; horizontal/vertical/perpendicular/parallel lines
Interpret/present data in bar charts/pictograms/tables; solve 1-step & 2-step Qs from them

Year 3 (SPR)
Pure Read/write/compare no.s up to 1000 (numerals/words); pv of 3-digit no.s; count in multiples of 4/8/50/100; find 10 or 100 more/less than a given number
Mentally add HT+O, HTO+10s, HTO+100s; +/- 3-digit no.s using formal methods; use Inverse
Recall & use x/- facts for 3x, 4x and 8x

Year 3 (AUT)
Pure Recognise/use pounds (£) and pence (p); combine amounts to make a particular value; find combinations that equal the same amount; solve practical problems
Recall facts 2x/5x/10x; recognise add/even numbers; use x/- symbols in number sentences; commutativity of x but not + use arrays, repeated addition & facts to solve x/- problems
Estimate/measure length/height in any direction; mass; temp; capacity; compare/order use < > =
Recognise/find/name/write $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$ and $\frac{3}{4}$ of a length/shape/set of objects/quantity; write simple fractions e.g. $\frac{1}{2}$ of 6 = 3; recognise equivalence of two quarters and one half

Year 2 (SUM)
Pure Count to/across 100, forwards/backwards, beginning with 0 or 1 or from any given number
Reinforce multiples of 2, 5 & 10; solve 1-step x/- problems; use arrays
Recognise, find & name a half as 1 of 2 equal parts of an object/shape/quantity
Recognise, find & name a quarter as 1 of 4 equal parts of an object/shape/quantity
Describe position/direction/movement incl. whole, half, quarter & three quarter turns
Money, time

Year 2 (SPR)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Year 2 (AUT)
Pure Counting forwards/backwards (through songs); writing numbers (as/when ready)
Addition/subtraction through more/less/fewer
Introduce money; coin recognition; capacity (full/empty)
Beebots forwards/backwards positional language

Year 1 (SUM)
Pure Sorting; rote counting; 1:1 correspondence; recognition of 0-5; ordering numerals
Introduction to shape
Longest/shortest; sequencing events day/night/time language

Year 1 (SPR)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Year 1 (AUT)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Reception (SUM)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Reception (SPR)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Reception (AUT)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Nursery (SUM)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Nursery (SPR)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

Nursery (AUT)
Pure Counting & recognition; comparing numbers in different contexts, recognising when one quantity is greater than/less than, the same as/equal to another quantity
Add, plus, take away, minus, subtract, what is left
Exploring number bonds beyond 5
Number bonds to 10; begin to automatically recall some number bonds to 10
Classify and sort 2D shapes
Size, weight, capacity
Time language: before, after

KEY:
■ Number: Place Value
■ Number: Addition & Subtraction
■ Number: Multiplication & Division
■ Fractions, Decimals & Percentages
■ Ratio & Proportion
■ Algebra
■ Measurement
■ Geometry
■ Statistics