To be a grade 1 I need to…

- Order positive and negative integers
- Understand addition and subtraction of whole numbers and decimals
- Apply the four operations in correct order to integers and proper fractions
- Work with simple division (Dividing by 2, 9, 10, 5)
- Recognise multiples up to 10 × 10
- Square numbers 10 x 10, and 1 x 1 up to 5 x 5
- Find the range from a set of data.
- Understand what the terms face, edge and vertex mean
- Identify and name a cube, cuboid, cylinder, prism, pyramid, sphere and cone
- Recognise the properties of squares
- Recognise the properties of rectangles
- Scale a shape on a grid (without a centre specified)
- Understand and use the language associated with reflections and translations
- Recognise where a shape will be after reflection
- Draw sketches of shapes
- Find the perimeter of a square/rectangle by counting
- Suggest the units to measure length, mass and capacity
- Work out time intervals.
- Use diagrams to compare two or more simple fractions

To be a grade 2 I need to…

- Round decimals to the nearest whole number and to significant figures
- Know and use BIDMAS and use symbols = , ≠, <, >, ≤, ≥
- Begin to add and subtract simple fractions with simple common denominators
- Add, subtract, divide and multiply - positive and negative numbers
- Simplify fractions and calculate simple fractions of quantities
- Find the prime factor decomposition of a number less than 100 and find the HCF or LCM of two numbers
- Convert (and order) terminating decimals to fractions, e.g. 0.23 = 23/100
- Make estimates and approximations of calculations - use a range of ways to find an approximate answer
- Substitute integers into algebra equations and solve for missing values
- Read values from and draw, straight-line graphs for real-life situations
- Plot a simple distance-time graph and straight-line graphs
- Show inequalities on a number line
- Find the next term in a sequence and generate terms of simple sequences
- Know that the probabilities of a set of outcomes sum to 1
- Produce pictograms, two way tables and Interpret simple pie charts
- Calculate find the range, modal class, interval containing the median and find an estimate of the mean
- Calculate angles around a point, Recognise and use vertically opposite angles, Use sum of angles in a triangle to find missing angle values
- Use ratio notation and reduce a ratio to its simplest form

To be a grade 3 I need to…

- Add and subtract simple fractions with denominators of any size
- Be able multiple or divide any number by 0.1 and 0.01
- Add and subtract negative integers from positive and negative numbers
- Simplify ratios to their simplest form, including three-part ratios
- Use strategies for finding equivalent fractions, decimals and percentages
- Find the outcome of a given percentage increase or decrease
- Compare two quantities using percentages
- Use percentages in real-life situations
- Convert between metric measures of area, volume and capacity
- Know rough metric equivalents of imperial measures in daily use (feet, miles, pounds, pints, gallons)
- Know that translations, rotations and reflections preserve length and angle
- Enlarge 2-D shapes, given a centre of enlargement and a scale factor
- Draw circles and arcs to a given radius
- Solve geometric problems of equilateral, isosceles and right-angled triangles
- Begin to use trig ratios to find the size of an angle in a right-angled triangle
- Construct shapes:- equilateral triangles, regular hexagon inside a circle
- Use a formula to calculate the area of triangles, parallelograms, trapeziums, cubes and cuboids
- Calculate the interior or exterior angles of regular polygons
- Draw and interpret scatter graphs
- Calculate the mean and range from a frequency table for discrete data

To be a grade 4 I need to…

- Know that a number multiplied by its reciprocal is 1
- Find HCF and LCM using prime factors
- Add and subtract fractions (mixed) - positive and negative
- Use the square, cube and power keys on a calculator
- Use the laws of indices to add, subtract, multiply and divide numbers written in index notation
- Convert between currencies
- Check reasonableness of answers
- Estimate answers to one- or two-step calculations
- Write numbers greater than 10 in standard form
- Rearrange simple equations
- Find and use the nth term of an arithmetic sequence
- Record outcomes of events in a Venn Diagram
- Use more complex two way tables
- Identify positive, negative and no correlation using lines of best fit
- Use accurate drawing to solve bearings problems
- Calculate the interior angles of polygons
- Calculate the volume of right prisms
- Calculate the surface area of right prisms
- Find the perimeters and areas of semicircles and quarter circles
- Use vector notation for translations

To be a grade 5 I need to…

- Calculate with roots (surds & exact values)
- Write numbers less than 10 in standard index form and order them
- Solve quadratic equations algebraically by factorising
- Interpret distance-time graphs and calculate the speed of individual sections, total distance, total time and interpret gradient as rate of change
- Solve more complex linear inequalities and represent the solution on a number line e.g. $-6 < 2n+4$ or $-9 < 2n + 3 < 7$
- Generate arithmetic sequences of numbers and squared integers
- Recognise and use simple geometric progressions
- Solve exactly, by elimination of an unknown, linear simultaneous equations (including where both need multiplying)
- Use tree diagrams to calculate the probability of two dependent events
- Construct cumulative frequency tables and produce and interpret box plots
- Find the surface area and volumes of compound solids constructed from cubes, cuboids, cones, pyramids, spheres, hemispheres, cylinders
- Recognise the formulae for length of arcs and area of sectors in a circle Use similarity to solve problems in 2D shapes
- Understand how standard constructions using straight edge and compasses relate to the properties of two intersecting circles with equal radii
- Use and apply Pythagoras' theorem to solve problems
- Use the sine, cosine and tangent ratios to find the lengths of unknown sides

To be a grade 6 I need to…

- Use inequality notation to specify simple error intervals
- Estimate powers and roots of any given positive number
- Expand double brackets $(ax \pm b)(cx \pm d)$
- Solve quadratic equations by completing the square
- Change the subject of a more complex formula that involves the square root or fractions
- Recognise, sketch & interpret graphs of simple cubic & reciprocal graphs
- Solve linear inequalities in two variables graphically
- Solve two simultaneous inequalities algebraically and show the solution set on a number line
- Continue a quadratic sequence and use the nth term to generate terms
- Simplify expressions involving brackets & powers e.g. $x(x^2+x+4)$
- Construct/interpret cumulative frequency graphs
- Find the median, quartiles and interquartile range for large data sets with grouped data
- Prove and use circle theorems
- Use the sine, cosine and tangent ratios to find the lengths of unknown sides in a right-angled triangle
- Use the appropriate ratio to find a length, or angle, and hence solve a two-dimensional problem
- Use expressions of the form $y \propto x^2$

To be a grade 7 I need to…

- Convert a recurring decimal to a fraction in simple cases
- Find the value of calculations using indices including fractional and negative
- Solve simple quadratic equations by using the quadratic formula
- Expand two or more brackets
- Find the equation of the line through two given points
- Use Venn diagrams to calculate probability
- Understand selection with or without replacement
- Use a tree diagram to calculate conditional probability
- Know the appropriate use of Histograms
- Compare the mean, median, mode and range as appropriate of two distributions
- Calculate the length of a diagonal of a cuboid
- Calculate the new area of a shape after enlargement
- Calculate the resultant of two vectors
- Factorise quadratic expressions of the form $ax^2 + bx + c$
- Use function notation
- Understand, recall and use Pythagoras' theorem in 3-D problems
- Enlarge 2D shapes, given a negative, fractional scale factor
- Know and apply the sine rule to find unknown lengths and angles
- Solve problems including examples of solids in everyday use
- Calculate the area of a triangle given the length of two sides and the included angle

To be a grade 8 I need to…

- Calculate the upper and lower bounds of other compound measurements
- Write $(3 - \sqrt{3})^2$ in the form $a + b\sqrt{3}$
- Rationalise a denominator of a fraction with surds
- Find the inverse of a linear function
- Plot graphs of the exponential function $y = kx$ for integer values of x and simple positive values of k
- Recognise, sketch and interpret graphs of trigonometric functions for sin, cos and tan within the range -360° to +360°
- Interpret transformations of graphs and write the functions algebraically, e.g. write the equation of f(x) + a or f(x - a)
- Apply to $y = f(x)$ the transformations $y = -f(x)$, $y = f(-x)$, $y = -f(-x)$ & $y = f(x) + a$
- Construct the graphs of simple loci including the circle $x^2 + y^2 = r^2$ for a circle
- Find the nth term of a quadratic sequence n^2 ,an^2, $an^2 \pm b$ & $an^2 \pm bn \pm c$,
- Solve by elimination of an unknown linear/$x^2 + y^2 = r^2$ simultaneous equations
- Use and understand frequency density
- Construct and interpret histograms from class intervals with unequal width
- Use formulae for length of arcs & area of sectors of circles to solve problems
- Give reasons for angle sizes using mathematical language
- Know and apply the cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$ to find unknowns
- Know & apply area = 1/2 ab sin C to calculate sides or angles of any triangle
- Prove lines are parallel/colinear

To be a grade 9 I need to…

- Solve quadratic equations from algebraic fractions
- Find f(x) + g(x) , 2f(x), f(3x) etc algebraically
- Interpret two functions as a 'composite function' eg for f(x) and g(x) find gf(x)
- Estimate area under a quadratic graph by dividing it into trapezia
- Find the gradient of linear or non-linear graphs, for quadratics sketch the tangent and finding its gradient
- Find the equation of a tangent to a circle at a given point
- Interpret coordinates for trigonometric graphs
- Plot graphs of the exponential function $y = ab^x$ for integer values of x and positive a & b
- Use iteration with simple converging sequences
- Solve problems involving segments of circles and frustums of cones
- Find the area of a segment of a circle given the radius and length of the chord
- Solve problems for areas and volumes of similar shapes and solids
- Use the trigonometric ratios to solve 3D problems
- Find the angle between a line and a plane
- Know the exact values of sinΘ and cosΘ for Θ = 0°, 30°, 45°, 60° and 90°; know the exact value of tanΘ for Θ = 0°, 30°, 45° and 60°
- Use the sine and cosine rules to solve 2D and 3D problems
- Apply vector methods for simple geometrical proofs