

Maths Subject Knowledge Audit

Throughout this course, you must demonstrate continuous improvement in your subject knowledge to meet the required standards. Strong expertise in your subject is essential for effective teaching. You will show your knowledge partly through lesson observations, but also by completing the subject knowledge audit below at each assessment point during your training year. The audit's red-amber-green rating of course content will map your progress. This live document will serve as a professional tool that you can build on throughout the early stages of your teaching career.

RAG Rating Key	
S	Secure knowledge = I have good pedagogical content knowledge and would be able to teach it
D	Developing knowledge = I understand it, I need to study it further to be able to teach it
L	Limited Knowledge = I have little knowledge and have not seen it taught

Subject Knowledge	Pre-Course Knowledge	AP1 Autumn Term	AP2 Spring Term	AP3 Summer Term	Final Assessment Summer Term	Action Plan for Development
Dates		18 November 24 to 2 December 24	3 March 25 to 24 March 25	28 April 25 to 12 May 25		
Exam Specifications						
<u>Edexcel GCSE Mathematics</u>						
<u>AQA GCSE Mathematics</u>						
<u>OCR GCSE Mathematics</u>						
<u>WJEC GCSE Mathematics</u>						
Number						
Use place value, order positive and negative integers, decimals and fractions						
Find and use factors, multiples and primes, HCF and LCM, appreciate the unique prime factorisation of all natural numbers						

	Pre-Course Knowledge	AP1 Autumn Term	AP2 Spring Term	AP3 Summer Term	Final Assessment Summer Term	Action Plan for Development
Use the four operations and the order of operations						
Evaluate powers and indices including squares and cubes						
Convert between standard form and ordinary numbers, calculate with standard form						
Convert between fractions, decimals and percentages						
Use percentage change, perform percentage increase and decrease, find and use percentage multipliers						
Use standard units of mass, length, time, money and other measures, including with decimal quantities						
Round numbers to a given number of decimal places or significant figures Be able to approximate and estimate						
Use systematic listing strategies, including the product rule for counting						
Calculate with roots, and with integer and fractional indices						
Calculate exactly with fractions, surds and multiples of π ; simplify and manipulate surd expressions						
Find and use upper and lower bounds						
Algebra						
Substitute into formulae and expressions						
Manipulate algebraic expressions by collecting like terms, expanding and factorising a single bracket, expanding products of two or more binomials						
Rearrange formulae to change the subject						
Solve linear equations in one variable						
Factorise quadratic expressions						

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Solve quadratic equations by factorising, by completing the square and by using the quadratic formula						
Work with coordinates in all four quadrants						
Recognise, sketch and produce graphs of linear and quadratic functions						
Use the form $y = mx + c$ and calculate and interpret gradients and intercepts of graphs						
Be able to identify parallel and perpendicular lines; find the equation of the line through two given points, or through one point with a given gradient						
Solve two simultaneous equations in two variables (linear/linear or linear/quadratic) algebraically; find approximate solutions using a graph						
Simplify expressions involving sums, products and powers, including the laws of indices Know the difference between an equation and an identity, construct mathematical arguments and proofs						
Use function notation, find composite and inverse functions						
Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically and turning points by completing the square						
Recognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions, the reciprocal function, the exponential functions and the trigonometric functions						
Use graphs in a variety of real-life contexts, including solving kinematic problems involving distance, speed and acceleration						

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Calculate or estimate gradients of graphs and areas under graphs and interpret results in cases such as distance-time graphs, velocity-time graphs and graphs in financial contexts						
Recognise and use the equation of a circle with centre at the origin; find the equation of a tangent to a circle at a given point						
Find approximate solutions to equations numerically using iteration						
Translate simple situations or procedures into algebraic expressions or formulae						
Solve linear inequalities in one or two variables, and quadratic inequalities in one variable; represent the solution set on a number line, using set notation and on a graph						
Recognise and use sequences of triangular, square and cube numbers, simple arithmetic progressions, Fibonacci type sequences, quadratic sequences, and simple geometric progressions Deduce expressions to calculate the nth term of linear and quadratic sequences						
Ratio, Proportion and Rate of Change						
Convert between related standard units (time, length, area, volume/capacity, mass)						
Use scale factors, scale diagrams and maps						
Express one quantity as a fraction of another						
Use ratio notation, including reduction to simplest form						
Divide a given quantity into two parts in a given part: part or part: whole ratio; express the division of a quantity into two parts as a ratio						

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Solve problems involving percentage change, including percentage increase, decrease and original value problems and simple interest in financial mathematics						
Use direct and inverse proportion						
Compare lengths, areas and volumes using ratio notation and/or scale factors						
Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts						
Interpret the gradient of a straight-line graph as a rate of change; recognise and interpret graphs that illustrate direct and inverse proportion						
Find instantaneous and average rate of change using gradients of tangents and chords						
Model growth and decay problems, including compound interest and general iterative processes						
Geometry and Measures						
Find area and perimeter of standard 2D shapes and composite shapes						
Find volume and surface area of standard 3D shapes and composite solids						
Construct the perpendicular bisector of a line segment, construct a perpendicular to a given line from/at a given point, bisect a given angle						
Describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric						
Transform shapes using translations, rotations and reflections, enlargements and combinations of these						

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Identify and construct congruent triangles, and construct similar shapes by enlargement, with and without coordinate grids						
Apply the properties of angles at a point, angles at a point, on a straight line, vertically opposite angles, and in parallel lines						
Derive and use the sum of angles in a triangle and use it to deduce the angle sum in any polygon, and to derive properties of regular polygons						
Use Pythagoras' Theorem and trigonometric ratios in similar triangles to solve problems involving right-angled triangles						
Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3D						
Describe the changes and invariance achieved by combinations of rotations, reflections and translations						
Identify and apply circle definitions and properties, including centre, radius, chord, diameter, circumference, tangent, arc, sector and segment Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results						
Construct and interpret plans and elevations of 3D shapes						
Interpret and use bearings						
Calculate arc lengths, angles and areas of sectors of circles						
Apply the concepts of congruence and similarity, including the relationships between lengths, areas and volumes in similar figures						

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Apply Pythagoras' Theorem and trigonometric ratios to find angles and lengths in right-angled triangles and in two and three dimensional figures						
Know exact trigonometric values						
Know and apply the sine rule and cosine rule to find unknown lengths and angles in non-right-angled triangles, find the area of non-right-angled triangles						
Describe translations as 2D vectors						
Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representations of vectors; use vectors to construct geometric arguments and proofs						
Probability						
Record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness, equally and unequally likely outcomes, using appropriate language and the 0-1 probability scale						
Enumerate sets and unions/intersections of sets systematically, using tables, grids and Venn diagrams Generate theoretical sample spaces for single and combined events with equally likely, mutually exclusive outcomes and use these to calculate theoretical probabilities						
Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one						
Calculate the probability of independent and dependent combined events, including using tree diagrams						

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Calculate and interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams						
Statistics						
Work with discrete, continuous and grouped data						
Find measures of central tendency (mean, mode and median) and spread (range) and use these to interpret and compare sets of data						
Construct and interpret frequency tables, bar charts, pie charts, and pictograms for categorical data, and vertical line/bar charts for ungrouped and grouped numerical data						
Construct and interpret scatter graphs of bivariate data, recognise correlation						
Infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling						
Construct and interpret tables and line graphs for time series data						
Construct and interpret histograms						
Find quartiles and interquartile range, draw box plots and cumulative frequency graphs						
Overarching Mathematical Themes						
Mathematical fluency						
Mathematical reasoning						
Mathematical modelling						
Problem solving						
Mathematical Skills						
Use of calculators						
Use of graphing technology such as Desmos and GeoGebra						