**Curriculum Planning Document**

**Model 1 – Parallel over two years**

**Introduction**

This GCE AS and A Level Curriculum Planning Document has been designed to help you develop schemes of work for delivering reformed Mathematics and Further Mathematics qualifications in parallel.

This document details a possible programme for coteaching

H230 OCR AS Level Mathematics A

H240 OCR A Level Mathematics A

H235 OCR AS Level Further Mathematics A

H245 OCR A Level Further Mathematics A

The document should be used in conjunction with the full specification documents and the Teaching Order Framework. One key feature of the OCR A Level Mathematics and Further Mathematics specifications is their two-column structure, setting out the required content in a format to clearly show the progression through AS Level and A Level.

This document is fully customisable so it can be edited to suit your own particular cohort, however care should be taken to avoid introducing content without the required prerequisite knowledge. The route provided is a ‘best fit’, effective for whichever of the Further Mathematics options are taken (centres that do not offer all four Further Mathematics options will have less prior knowledge constraints that will need to be balanced and more flexibility for editing). The structure of the Curriculum Planning Document has been produced based on the assumption of A Level Maths and A Level Further Maths being taught as two fully timetabled qualifications, each covered by two teachers. In A Level Mathematics there is an assumption that Teacher A acts as a specialist in statistics and Teacher B acts as a specialist in mechanics (with both teaching aspects of the pure content). In A Level Further Maths there is an assumption that Teachers C and D each deliver one of the four options (with both teaching aspects of the core pure content).

Model 1 assumes that the optional content in Further Maths will be spread out over the course, rather than taught in a single block

This is an early sight draft version to help with initial planning. Space has been provided for adding notes and links to resources. Notes on prior knowledge include reference to content learners would have seen during Key Stage 4, reference codes relate to OCR J560 GCSE (9-1) Mathematics.

**Download specifications, sample assessment materials, teaching and learning resources at** [**ocr.org.uk/alevelmathematics**](http://www.ocr.org.uk/qualifications/as-a-level-gce-mathematics-a-h230-h240-from-2017/)[**ocr.org.uk/alevelfurthermaths**](http://www.ocr.org.uk/qualifications/as-a-level-gce-further-mathematics-a-h235-h245-from-2017/)

**Summary**

| **wk/ Term** | **Teacher A**  **Maths** | **Teacher B**  **Maths** | **Teacher C & D**  **Further Maths** | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **(Each teacher deliveries core pure + 1 applied component)**  **[Students study all core pure + both applied components]** | | **(Each teacher delivers core pure + 1 option) [Students study all core pure + 2 options]** | | | |
| Y532 Stats | Y533 Mech | Y534 Discrete | Y535 Add Pure |
| 1/T1 | [LDS and Sampling](#LargedataSetandSampling)  2.02 a | [Algebra and Functions](#AlgebraandFunctions)  1.02 a, b, c, d, e | P & C  5.01 a | Dim Analysis  6.01 a, b, d | Graphs  7.02 a, b, c, g | Number Theory  8.02 a, b, c, d |
| 2/T1 | [Sampling](#StatisticalSampling)  2.01 a, b, c, d | [Proof](#Proof)  1.01 a, b, c | Applications of P & C  5.01 b | Dim Analysis  6.01 c, e | Graphs  7.02 d, e, p, q, r | Number Theory  8.02 e, f, i, j, k |
| 3/T1 | [Coordinate Geometry](#CoordinateGeometry)  1.03 a | [Binomial Expansion](#BinomialExpansion)  1.04 a | Proof by Induction  4.01 a | | The language of complex numbers  4.02 a, b, c | |
| 4/T1 | [Equations of lines](#EquationsofLines)  1.03 b, c | [Polynomials and Graphs](#PolynomialsandGraphs)  1.02 m, n, o | The language of Matrices  4.03 a, b, c | | Basic Operations with complex numbers (Radians)  4.02 e, f | |
| 5/T1 | [Equations of circles](#EquationsofCircles)  1.03 d, e, f | [Units and Kinematics](#UnitsandKinematics)  3.01 a, b 3.02 a, b | Determinants and Inverses  4.03 h, j, l, m, n, o, p | | Solutions of equations  4.02 g, h, i, j | |
| 6/T1 | [Vectors](#Vectors)  1.10 a, c, d | [Kinematic Graphs](#KinematicGraphs)  3.02 c | solutions of simultaneous equations  4.03 r | | Argand Diagrams and Loci  4.02 k, l, o, p | |
| 7/T1 | [Vectors](#Vectors2)  1.10 e, f, g | [Suvat Equations](#Suvat)  3.02 d | Chi Squared Contingency Tables  5.06 a | Energy  6.02 d, e | Mathematical Preliminaries  7.01 a, b, c | Groups  8.03 a, b |
| 8/T1 | [Probability](#Probability)  1.04 b, 2.03 a, b | [Differentiation and Gradients](#Differentiation)  1.07 a, b | Fitting distributions  5.06 b, d (ratio and proportion) | Energy  6.02 i | Mathematical Preliminaries  7.01 d, e, f, g, I, k | Groups  8.03 c, d |
| 9/T1 | [Binomial Distribution](#BinomialDistributions)  2.04 a, b, c | [Gradient Functions and 2nd derivatives](#Differentiation2)  1.07 c, d, e | Probability Distributions  5.02 a, b, c | Momentum  6.03 a, b | Algorithms  7.03 a, b, c | Groups  8.03 e, f |
| 10/T1 | [Graphs and Transformations](#GraphsandTransformations)  1.02 p, q, r, w | [1st Principles of Differentiation](#Differentiation3)  1.07 g, i | Binomial, Uniform and Geometric distributions  5.02 d, e, f, g, h | Restitution  6.03 i, j | Algorithms  7.03 j, l | Groups  8.03 g, h |
| 11/T1 | [Polynomial Equations](#PolynomialEquations)  1.02 f, j | [Equations of tangents and normal](#Equationsoftangentsandnormals)  1.07 m | Linear Transformations using matrices  4.03 d, e, f | | Vectors  4.04 a, c, e, g | |
| 12/T1 | [Inequalities](#Inequalities)  1.02 g, h, i | [Stationary Points](#StationaryPoints)  1.07 n, o | Invariance and scale factors  4.03 g, i, k, q | | Roots of equations  4.05 a, b | |
| 1/T2 | [Data Presentation](#DataPresentation)  2.02 b | [Forces](#Forces)  3.03 a, f, g | Fitting distributions  5.06 b, d (Bin, U and Geo) | Resolving forces (preliminary work) | Graphs  7.02 j, k | Properties of groups  8.03 i |
| 2/T2 | [Bivariate Data](#BivariateData)  2.02 c, d, e | [Newton’s Law](#NewtonsThirdLaw)s  3.03 b, c, d, h | Dependent and Independent Variables  5.09 a | Impulse  6.03 e, f | Network Algorithms  7.04 a | Properties of sequences  8.01 a, b, h |
| 3/T2 | [Average, Spread and Outliers](#Averagespreadoutliers)  2.02 f, g | [Equilibrium](#Equilibrium)  3.03 I, j, r | Linear regression  5.09 b, c, d, e | Restitution  6.03 i, j, k | Network Algorithms  7.04 b, f | Properties of sequences  8.01 c, d |
| 4/T2 | [Working with LDS](#WorkingwithLargeDataSet)  2.02 j | [Connected](#Friction) Particles  3.03 k, n | PMCC  5.08 a, b, c | Work, Energy and Power  6.02 a, b, (i) | Critical Path Analysis  7.05 a | Fibonnaci and Solving relations  8.01 e, f |
| 5/T2 | [Exponentials and Logarithms](#ExponentialsandLogarithms)  1.06 a, b, c | [Trigonometry](#Trigonometryindegrees)  1.05 a, b, c | SRC  5.08 e, g | Work, Energy and Power  6.02k, l, (i) | Critical Path Analysis  7.05 b, c | Vector product and scalar triple product  8.04 a, b, c, d |
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| 6/T2 | [Exponential Graphs](#ExponentialGraphs)  1.06 d, e, f | [Trigonometry Functions](#Trigonometryindegrees2)  1.05 f, j, o | Recap of Proof and Matrices | | Recap of Complex numbers and Vectors | |
| 7/T2 | [Modelling with exponentials](#ModellingwithExponentials)  1.06 g, h, i | [Fundamental Theorem of Calculus](#FundamentalTheoremofCalculus)  1.08 a, b | Poisson  5.02 i, j, k, l, | Uniform motion in a circle  6.05 a | Algorithms  7.03 d, e, f, g | Surfaces  8.05 a |
| 8/T2 | [Statistical Hypothesis Testing](#StatisticalHypothesisTesting)  2.05 a | [Definite Integrals](#DefiniteIntegrals)  1.08 d | Poisson 5.02 m , n + 5.06b, d | Uniform motion in a circle  6.05 b | Graphical Linear Programming  7.06 a, c | Sections and contours  8.05 c |
| 9/T2 | [Binomial Hypothesis Testing](#BinomialHypothesisTesting)  2.05 b | [Area between curve and x-axis](#Areabetweencurveandaxis)  1.08 e | Hypothesis tests 5.08d | Uniform motion in a circle  6.05 c | Graphical Linear Programming  7.06 d | Partial Diff  8.05 d |
| 10/T2 | [Inference](#Inference)  2.05 c | [Variable Acceleration](#VariableAcceleration)  3.02 d, f | Hypothesis tests 5.08f | Motion in a vertical circle  6.05 d | Game Theory  7.08 a, b, c, e | Stationary points  8.05 e |
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| 1/T3 | [Conditional Probability](#ConditionalProbability)  2.03 c, d, e | [Radians and Trigonometry](#RadianTrigonometry)  1.05 d, e | Non-parametric Tests  5.07 a, b | Hooke’s law  6.02 g, h | Graphs and Networks  7.02 f, h, i, | Finite (modular) arithmetic  8.02 g |
| 2/T3 | [Algebra and Functions](#Algebraandfunctions2)  1.02 u, v, x | [Radians and Trigonometry](#RadianTrigonometry)  1.05 g, h, i, k, o | Single Sample hypothesis tests  5.07 c | Linear momentum in 2-D  6.03 c, d | Graphs and Networks  7.02 l, m, n, o | Finite (modular) arithmetic  8.02 h |
| 3/T3 | [Series and Sequences](#SeriesSequences)  1.04 c, d, e, f, g | [Numerical Methods](#NumericalMethods)  1.09 a, b, c | Paired-sample and two sample hypothesis test  5.07 d | Oblique impact  6.03 g, h | Network Algorithms  7.04 c, d, e | Fermat’s little theorem and binomial theorem  8.02 l, o |
| 4/T3 | [AP and GP](#APandGP)  1.04 h, i, j, k | [Newton-Raphson](#NumericalMethods2)  1.09 d, e | Test for identity  5.07 e | NEL  6.03 l | Network Algorithms  7.04 c, d, e | Order  8.02 m, n |
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| 5/T3 | [Parametric form](#Parametricform)  1.03 g | [Moments about a point](#Moments)  3.01 c, 3.04 a, b | Proof  4.01 b | | Exponential form of complex numbers and geometric effects  4.02 d, m | |
| 6/T3 | [Modelling using parametric equations](#Modellingusingparametricequations)  1.03 h | [Modelling Static problems](#Modellingusingmoments)  3.04 c | Solutions of equations and intersection of planes  4.03 s, t | | Euler’s formula and de Moivre’s theorem  4.02 n, q, r, s | |
| 7/T3 | [Normal Distribution](#NormalDistribution)  2.04 e, f | [Introduction to Differential Equations](#IntroductiontodifferentialEquations)  1.07 t | Continous random variables  5.03 a | Centre of Mass of symmetric lamina  6.04 a, b | Arrangement and Selection problems  7.01 h, j | Groups  8.03 j, k, l |
| 8/T3 | [Normal Distribution](#NormalDistributionModel)  2.04 d, g, h | [Analytical Solutions of Differential Equations](#AnalyticalSolDiffEqu)  1.08 k | Probability density functions  5.03 b, c, d | Composite Rigid bodies  6.04 c | Inclusion-exclusion principle  7.01 l | Groups  8.03 m |
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| 1/T4 | [Partial Fractions](#PartialFractions)  1.02 k, y | [Proof by Contradiction](#Proofbycontradiction)  1.01 d | Summation of series  4.06 a | | Further Vectors  4.04 b, d, f | |
| 2/T4 | [Modulus Function](#ModulusFunction)  1.02 l, s, t | [3D Vectors](#DVectors)  1.10 b | Method of differences  4.06 b | | Further Vectors  4.04 h, i, j | |
| 3/T4 | [Binomial Expansion](#BinomialExpansion2)  1.04 c | [Further Vectors and Kinematics](#FurtherVectors)  1.10 h, 3.02 e | Cumulative distribution functions  5.03 e, f, | Work in 2-D  6.02 c | Efficiency and complexity of Algorithms  7.03 h, i, | Scalar Vector  8.04 e |
| 4/T4 | [Normal and Hypothesis](#HypothesisTestingNormal)  2.05 d | [Resolving Forces](#Forces2)  3.03 e, l | Cumulative distribution functions  5.03 g | Energy  6.02 f | Strategies  7.03 k, m | Surfaces  8.05 b |
| 5/T4 | [Normal and Hypothesis](#HypothesisTestingNormal2)  2.05 e | [Forces in Equilibrium](#Forces3)  3.03 m, o | Random Variables  5.04 a | Conservation of Energy  6.02 j | Critical Path Analysis  7.05 d, e | Stationary points  8.05 f |
| 6/T4 | [Points of Inflection](#POintsofInflection)  1.07 f, p | [Resultant Forces in motion](#Forcesinmotion)  3.03 p, q, s, t, u | Normal Random Variables  5.04 b | Power  6.02 m | Critical Path Analysis  7.05 d, e | Tangent planes  8.05 g |
| 7/T4 | [Product and Quotient Rule](#ProductandQuotientRules)  1.07 q | [Area between two curves](#Area2curves)  1.08 f | Polar Coordinates  4.09 a, b | | Hyperbolic functions  4.07 a, b | |
| 8/T4 | [Chain Rule](#ChainRule)  1.07 r | [Integration as limit of a sum](#Integrationlimitofsum)  1.08 g 1.09 f | Area enclosed by polar curve  4.09 c | | Hyperbolic functions  4.07 c, d | |
| 9/T4 | [Trigonometry Identities](#TrigonometryIdentities)  1.05 k. l, m | [Integration by substitution](#Integrationbysub)  1.08 h | 5.06 Chi Squared Tests  5.06 c | Statics of solids  6.04 d, e | Game Theory  7.08 d, f | Second Order Recurrence Relation  8.01 g, i |
| 10/T4 | [Trigonometry Identities](#TrigonometryIdentities2)  1.05 n, o, p, q | [Motion in](#Motionprojectile) two dimensions  3.02 e, h, i | Differential Equations  4.10 a, c | | Volumes of solids of revolution  4.08 d | |
| 11/T4 | [Further Numerical Methods](#FurtherNumericalMethods)  1.09 g | [Projectile model](#Theprojectilemodel)  3.02 i | 2nd order homogeneous differential equations  4.10 d (real) | | Volumes of solids of revolution defined parametrically  4.08 d | |
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| 1/T5 | [Pearson’s product moment correlation](#Ppmc)  2.05 f | [Exponential calculus](#ExponentialCalculus)  1.07 j, l, 1.08 c | Central Limit Theorem  5.05 a | Motion in a Circle review | Graphical Linear Programming  7.06 b, e, f | Further Calculus  8.06 a |
| 2/T5 | [Hypothesis testing and correlation](#HypothesisTestingCorrelation)  2.05 g | [Trigonometrical calculus](#TrigonometryCalculus)  1.07 h, k, q, r | Population Mean and Variance  5.05 b | Radial and tangential components  6.05 e | The Simplex Algorithm  7.07 a, b, c, | Further Calculus  8.06 a |
| 3/T5 | [Functions and Modelling](#FunctionsandModelling)  1.02 z | [Trigonometrical calculus](#TrigonometryCalculus2)  1.08 c | Hypothesis Tests  5.05 c, 5.07 f | Free motion  6.05 f | The Simplex Algorithm  7.07 d | Further Calculus  8.06 b |
| 4/T5 | I[ntegration of parametric functions](#FurtherIntegration)  1.08 f | [Further Kinematics](#FurtherKinematics)  3.03 v | Confidence Intervals  5.05 d | Linear Motion under variable force  6.06 a | The Simplex Algorithm  7.07 e, f | Further Calculus  8.06 b |
| 5/T5 | [Integration by parts](#Integrationparts)  1.08 i, j | [Further Kinematics](#FurtherKinematics2)  3.02 g | Differential Equations  4.10 b | | Inverse Hyperbolic functions  4.07 e, f | |
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| 6/T5 | [Further Differential equations](#FurtherDifferentialequations)  1.07 t, 1.08 k, l | [Further Parametrics](#FurtherParametrics)  1.03 g, h, 1.07 s, 1.08 f | 2nd order homogeneous differential equations  4.10 d (real and complex) | | Further Integration  4.08 g | |
| 7/T5 | Pure Revision | Pure Revision | 2nd order non-homogeneous differential equations  4.10 e | | Further Integration  4.05 c 4.08 h | |
| 8/T5 | Statistics Revision | Mechanics Revision | Simple Harmonic Motion  4.10 f | | Maclaurin series  4.08 a, b | |
| 9/T5 | Statistics Revision | Mechanics Revision | Damped Oscillations  4.10 g | | Improper integrals  4.08 c | |
| 10/T5 | Pure Revision | Pure Revision | Linear Systems  4.10 h | | Further Calculus  4.08 e, f | |
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| 1/T6 | Pure Revision | Pure Revision | Core Revision | | Core Revision | |
| 2/T6 | Statistics Revision | Mechanics Revision | Option Revision | Option Revision | Option Revision | Option Revision |
| 3/T6 | Statistics Revision | Mechanics Revision | Core Revision | | Core Revision | |
| 4/T6 | Pure Revision | Pure Revision | Option Revision | Option Revision | Option Revision | Option Revision |
| 5/T6 | Pure Revision | Pure Revision | Core Revision | | Core Revision | |
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**Term 1 (AS and A Level)**

| **Week** | **Ref** | **Teacher A** | **Ref** | **Teacher B** |
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| **1/T1** | **Prior knowledge**  *GCSE review 12.03a* | | **Prior knowledge**  *GCSE review 3.01c, 3.03b, 6.01f, 6.03b, 6.03c, 6.03d* | |
| **2.02 a** | **Large data Set and Sampling**  Be able to interpret tables and diagrams for single-variable data. | **1.02 a**  **1.02 b**  **1.02 c**  **1.02 d**  **1.02 e** | **Algebra and Functions**  Understand and be able to use the laws of indices for all rational exponents.  Be able to use and manipulate surds, including rationalising the denominator.  Be able to solve simultaneous equations in two variables by elimination and by substitution, including one linear and one quadratic equation.  Be able to work with quadratic functions and their graphs, and the discriminant (*D* or) of a quadratic function, including the conditions for real and repeated roots.  Be able to complete the square of the quadratic polynomial . |
| **Resource links**  [**OCR LDS**](http://www.ocr.org.uk/Images/308727-units-h230-and-h240-large-data-set-lds-sample-assessment-material.xlsx)  [**2.02 Delivery Guide**](http://www.ocr.org.uk/Images/421345-section-2.02-data-presentation-and-interpretation-delivery-guide-version-1-.docx) | | **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx)  [**Bridging the gap between GCSE and AS/A Level – A Student Guide**](http://www.ocr.org.uk/Images/373371-bridging-the-gap-between-gcse-and-as-a-level-mathematics-a-student-guide.docx) | |
| **2/T1** | **Prior knowledge**  *GCSE review 12.01a* | | **Prior knowledge**  *GCSE review 6.01a, 6.01b* | |
| **2.01 a**  **2.01 b**  **2.01 c**  **2.01 d** | **Statistical Sampling**  Understand and be able to use the terms ‘population’ and ‘sample’.  Be able to use samples to make informal inferences about the population.  Understand and be able to use sampling techniques, including simple random sampling and opportunity sampling.  Be able to select or critique sampling techniques in the context of solving a statistical problem, including understanding that different samples can lead to different conclusions about the population. | **1.01 a**  **1.01 b**  **1.01 c** | **Proof**  Understand and be able to use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion.  Understand and be able to use the logical connectives .  Be able to show disproof by counter example. |
| **Resource links**  [**2.01 Delivery Guide**](http://www.ocr.org.uk/Images/412028-section-2.01-statistical-sampling-delivery-guide-version-1-.docx) | | **Resource links**  [**1.01 Delivery Guide**](http://www.ocr.org.uk/Images/407055-section-1.01-proof-delivery-guide-version-1-.docx) | |
| **3/T1** | **Prior knowledge**  *GCSE review 7.02a* | | **Prior knowledge**  *GCSE review 11.02b* | |
| **1.03 a** | **Coordinate Geometry**  Understand and be able to use the equation of a straight line, including the forms ,  and . | **1.04 a** | **Binomial Expansion**  Understand and be able to use the binomial expansion of  for positive integer  and the notations  and ,  or , with . |
| **Resource links**  [**1.03 Delivery Guide**](http://www.ocr.org.uk/Images/413786-section-1.03-coordinate-geometry-delivery-guide-version-1-.docx) | | **Resource links**  [**1.04 Delivery Guide**](http://www.ocr.org.uk/Images/415095-section-1.04-sequences-and-series-delivery-guide-version-1-.docx) | |
| **4/T1** | **Prior knowledge**  GCSE review 7.02b | | **Prior knowledge**  *GCSE review 7.01b, 7.01c* | |
| **1.03 b**  **1.03 c** | **Equations of Lines**  Be able to use the gradient conditions for two straight lines to be parallel or perpendicular.  Be able to use straight line models in a variety of contexts. | **1.02 m**  **1.02 n**  **1.02 o** | **Polynomials and Graphs**  Understand and be able to use graphs of functions.  Be able to sketch curves defined by simple equations including polynomials.  Be able to sketch curves |
| **Resource links**  [**1.03 Delivery Guide**](http://www.ocr.org.uk/Images/413786-section-1.03-coordinate-geometry-delivery-guide-version-1-.docx) | | **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx) | |
| **5/T1** | **Prior knowledge**  *GCSE review 7.01f, 8.05c, 8.05e, 8.05f, 10.05a* | | **Prior knowledge**  *GCSE 10.01a, 10.01b, 6.02e, 7.04a* | |
| **1.03 d**  **1.03 e**  **1.03 f** | **Equations of Circles**  Understand and be able to use the coordinate geometry of a circle including using the equation of a circle in the form .  Be able to complete the square to find the centre and radius of a circle.  Be able to use the following circle properties in the context of problems in coordinate geometry:  1. the angle in a semicircle is a right angle,  2. the perpendicular from the centre of a circle to a chord bisects the chord,  3. the radius of a circle at a given point on its circumference is perpendicular to the tangent to the circle at that point. | **3.01 a**  **3.01 b**  **3.02 a**  **3.02 b** | **Units and Kinematics**  Understand and be able to use the fundamental quantities and units in the S.I. system: length (in metres), time (in seconds), mass (in kilograms).  Understand and be able to use derived quantities and units: velocity (m/s or ms-1), acceleration (m/s2 or ms-2), force (N), weight (N).  Understand and be able to use the language of kinematics: position, displacement, distance, distance travelled, velocity, speed, acceleration, equation of motion.  Understand, use and interpret graphs in kinematics for motion in a straight line. |
| **Resource links**  [**1.03 Delivery Guide**](http://www.ocr.org.uk/Images/413786-section-1.03-coordinate-geometry-delivery-guide-version-1-.docx) | | **Resource links**  [**3.01 Delivery Guide**](http://www.ocr.org.uk/Images/412029-section-3.01-quantities-and-units-delivery-guide-version-1-.docx)  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |
| **6/T1** | **Prior knowledge**  *GCSE review 9.03a, 9.03b* | | **Prior knowledge**  *GCSE review 7.04b, 7.04c* | |
| **1.10 a**  **1.10 c**  **1.10 d** | **Vectors**  Be able to use vectors in two dimensions.  Be able to calculate the magnitude and direction of a vector and convert between component form and magnitude/direction form.  Be able to add vectors diagrammatically and perform the algebraic operations of vector addition and multiplication by scalars, and understand their geometrical interpretations. | **3.02 c** | **Kinematic Graphs**  Be able to interpret displacement-time and velocity-time graphs, and in particular understand and be able to use the facts that the gradient of a displacement-time graph represents the velocity, the gradient of a velocity-time graph represents the acceleration, and the area between the graph and the time axis for a velocity-time graph represents the displacement. |
| **Resource links**  [**1.10 Delivery Guide**](http://www.ocr.org.uk/Images/413780-section-1.10-vectors-delivery-guide-version-1-.docx) | | **Resource links**  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |
| **7/T1** | **Prior knowledge**  **Vectors 1.10 a, c, d** | | **Prior knowledge**  *GCSE review 6.02e:* **Kinematic Graphs 3.02 b, c** | |
| **1.10 e**  **1.10 f**  **1.10 g** | **Vectors 2**  Understand and be able to use position vectors.  Be able to calculate the distance between two points represented by position vectors.  Be able to use vectors to solve problems in pure mathematics and in context, including forces. | **3.02 d** | **Suvat**  Understand, use and derive the formulae for constant acceleration for motion in a straight line: |
| **Resource links**  [**1.10 Delivery Guide**](http://www.ocr.org.uk/Images/413780-section-1.10-vectors-delivery-guide-version-1-.docx) | | **Resource links**  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |
| **8/T1** | **Prior knowledge**  *GCSE review 11.01d, 11.02a, 11.02c, 11.02d, 11.02e*  **Binomial Expansion 1.04 a** | | **Prior knowledge**  *GCSE review 7.02a, 7.02b, 7.04b*  **Polynomials and Graphs 1.02 j, m, n** | |
| **1.04 b**  **2.03 a**  **2.03 b** | **Probability**  Understand and know the link to binomial probabilities.  Understand and be able to use mutually exclusive and independent events when calculating probabilities.  Be able to use appropriate diagrams to assist in the calculation of probabilities. | **1.07 a**  **1.07 b** | **Differentiation**  Understand and be able to use the derivative of  as the gradient of the tangent to the graph of  at a general point .  Understand and be able to use the gradient of the tangent at a point where  as:  1. the limit of the gradient of a chord as  tends to  2. a rate of change of  with respect to *.* |
| **Resource links**  [**1.04 Delivery Guide**](http://www.ocr.org.uk/Images/415095-section-1.04-sequences-and-series-delivery-guide-version-1-.docx)  [**2.03 Delivery Guide**](http://www.ocr.org.uk/Images/415108-section-2.03-probability-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |
| **9/T1** | **Prior knowledge**  **Binomial Expansion 1.04 a** | | **Prior knowledge**  **Differentiation 1.07 a, b** | |
| **2.04 a**  **2.04 b**  **2.04 c** | **Binomial Distributions**  Understand and be able to use simple, finite, discrete probability distributions, defined in the form of a table or a formula  Understand and be able to use the binomial distribution as a model.  Be able to calculate probabilities using the binomial distribution, using appropriate calculator functions. | **1.07 c**  **1.07 d**  **1.07 e** | **Differentiation**  Understand and be able to sketch the gradient function for a given curve.  Understand and be able to find second derivatives.  *Learners should be able to use the notations  and  and recognise their equivalence*.  Understand and be able to use the second derivative as the rate of change of gradient. |
| **Resource links**  [**2.04 Delivery Guide**](http://www.ocr.org.uk/Images/415107-section-2.04-statistical-distributions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |
| **10/T1** | **Prior knowledge**  *GCSE review 6.03d, 7.03a* | | **Prior knowledge**  **Differentiation 1.07 a, b, c, d, e** | |
| **1.02 p**  **1.02 q**  **1.02 r**  **1.02 w** | **Graphs and Transformations**  Be able to interpret the algebraic solution of equations graphically.  Be able to use intersection points of graphs to solve equations.  Understand and be able to use proportional relationships and their graphs.  Understand the effect of simple transformations on the graph of  including sketching associated graphs, describing transformations and finding relevant equations: ,*,* and , for any real *a*. | **1.07 g**  **1.07 i** | **Differentiation**  Be able to show differentiation from first principles for small positive integer powers of .  *In particular, learners should be able to use the definition  including the notation.*  [*Integer powers greater than 4 are excluded*.]  Be able to differentiate *,* for rational values of *n*, and related constant multiples, sums and differences. |
| **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |
| **11/T1** | **Prior knowledge**  **Algebra and Functions 1.02 b, c** | | **Prior knowledge**  **Equations of Lines 1.03 b, Differentiation 1.07 i** | |
| **1.02 f**  **1.02 j** | **Polynomial Equations**  Be able to solve quadratic equations including quadratic equations in a function of the unknown.  Be able to manipulate polynomials algebraically, including the factor theorem | **1.07 m** | **Equations of tangents and normals**  Be able to apply differentiation to find the gradient at a point on a curve and the equations of tangents and normals to a curve. |
| **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |
| **12/T1** | **Prior knowledge**  *GCSE review 6.04b*:**Polynomial Equations 1.02f** | | **Prior knowledge**  **Differentiation 1.07 i** | |
| **1.02 g**  **1.02 h**  **1.02 i** | **Inequalities**  Be able to solve linear and quadratic inequalities in a single variable and interpret such inequalities graphically, including inequalities with brackets and fractions.  Be able to express solutions through correct use of ‘and’ and ‘or’, or through set notation.  Be able to represent linear and quadratic inequalities such as  and  graphically. | **1.07 n**  **1.07 o** | **Stationary Points**  Be able to apply differentiation to find and classify stationary points on a curve as either maxima or minima.  Be able to identify where functions are increasing or decreasing. |
| **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |

**Term 2 (AS and A level)**

| **Week** | **Ref** | **Teacher A** | **Ref** | **Teacher B** |
| --- | --- | --- | --- | --- |
| **1/T2** | **Prior knowledge**  *GCSE review 12.02b* | | **Prior knowledge**  *GCSE review 10.01b*  **Vectors 1.10 a, c, d, g** | |
| **2.02 b** | **Data Presentation**  Understand that area in a histogram represents frequency. | **3.03 a**  **3.03 f**  **3.03 g** | **Forces**  Understand the concept and vector nature of a force.  Understand and be able to use the weight  () of a body to model the motion in a straight line under gravity.  Understand the gravitational acceleration, *g*, and its value in S.I. units to varying degrees of accuracy. |
| **Resource links**  [**2.02 Delivery Guide**](http://www.ocr.org.uk/Images/421345-section-2.02-data-presentation-and-interpretation-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **2/T2** | **Prior knowledge**  *GCSE review 12.03c*  **Statistical Sampling 2.01 a** | | **Prior knowledge**  **Suvat 3.02 d** | |
| **2.02 c**  **2.02 d**  **2.02 e** | **Bivariate Data**  Be able to interpret scatter diagrams and regression lines for bivariate data, including recognition of scatter diagrams which include distinct sections of the population.  Be able to understand informal interpretation of correlation.  Be able to understand that correlation does not imply causation. | **3.03 b**  **3.03 c**  **3.03 d**  **3.03 h** | **Newton’s Laws**  Understand and be able to use Newton’s first law.  Understand and be able to use Newton’s second law  () for motion in a straight line for bodies of constant mass moving under the action of constant forces.  Understand and be able to use Newton’s second law  () in simple cases of forces given as two dimensional vectors.  Understand and be able to use Newton’s third law. |
| **Resource links**  [**2.02 Delivery Guide**](http://www.ocr.org.uk/Images/421345-section-2.02-data-presentation-and-interpretation-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **3/T2** | **Prior knowledge**  *GCSE review 12.03a, b, d* | | **Prior knowledge**  **Forces 3.03 f, g** | |
| **2.02 f**  **2.02 g**  **2.02 h**  **2.02 i** | **Average, spread and outliers**  Be able to calculate and interpret measures of central tendency and variation, including mean, median, mode, percentile, quartile, interquartile range, standard deviation and variance  Be able to calculate mean and standard deviation from a list of data, from summary statistics or from a frequency distribution, using calculator statistical functions.  Recognise and be able to interpret possible outliers in data sets and statistical diagrams.  Be able to select or critique data presentation techniques in the context of a statistical problem. | **3.03 i**  **3.03 j**  **3.03 r** | **Equilibrium**  Understand and be able to use the concept of a normal reaction force.  Be able to use the model of a ‘smooth’ contact and understand the limitations of the model.  Understand the concept of a frictional force and be able to apply it in contexts where the force is given in vector or component form, or the magnitude and direction of the force are given |
| **Resource links**  [**2.02 Delivery Guide**](http://www.ocr.org.uk/Images/421345-section-2.02-data-presentation-and-interpretation-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **4/T2** | **Prior knowledge**  **Data Presentation 2.02 a, b, c, f, g, h, i** | | **Prior knowledge**  **Forces 3.03 a, b, c, d, f, g, h, I, j**  **Suvat 3.02 d** | |
| **2.02 j** | **Working with Large Data Set**  Be able to clean data, including dealing with missing data, errors and outliers. | **3.03 k**  **3.03 n** | **Connected Particles**  Be able to use the concept of equilibrium together with one dimensional motion in a straight line to solve problems that involve connected particles and smooth pulleys.  Be able to solve problems involving simple cases of equilibrium of forces on a particle in two dimensions using vectors, including connected particles and smooth pulleys. |
| **Resource links**  [**2.02 Delivery Guide**](http://www.ocr.org.uk/Images/421345-section-2.02-data-presentation-and-interpretation-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **5/T2** | **Prior knowledge**  *GCSE review 7.01d*  **Indices 1.02 a** | | **Prior knowledge**  *GCSE review 6.02d, 10.05b, 10.05d, 10.05e, 10.03a*  **Surds 1.02 b** | |
| **1.06 a**  **1.06 b**  **1.06 c** | **Exponentials and Logarithms**  Know and use the function *ax* and its graph, where *a* is positive.  Know and use the function e*x* and its graph.  Know that the gradient of  is equal to  and hence understand why the exponential model is suitable in many applications.  Know and use the definition of  (for ) as the inverse of (for all ), where is positive. | **1.05 a**  **1.05 b**  **1.05 c** | **Trigonometry (in degrees)**  Understand and be able to use the definitions of sine, cosine and tangent for all arguments.  Understand and be able to use the sine and cosine rules.  Understand and be able to use the area of a triangle in the form . |
| **Resource links**  [**1.06 Delivery Guide**](http://www.ocr.org.uk/Images/416786-section-1.06-exponential-and-logarithms-delivery-guide-version-1-.docx) | | **Resource links**  [**1.05 Delivery Guide**](http://www.ocr.org.uk/Images/416575-section-1.05-trigonometry-delivery-guide-version-1-.docx) | |
| **6/T2** | **Prior knowledge**  **Exponentials and logarithms 1.06 a, b, c** | | **Prior knowledge**  *GCSE review 7.01e*  **Trigonometry 1.05 a** | |
| **1.06 d**  **1.06 e**  **1.06 f** | **Exponential Graphs**  Know and use the function  and its graph.  Know and use  as the inverse function of .  Understand and be able to use the laws of logarithms | **1.05 f**  **1.05 j**  **1.05 o** | **Trigonometry (in degrees)**  Understand and be able to use the sine, cosine and tangent functions, their graphs, symmetries and periodicities.  Understand and be able to use  and .  Be able to solve simple trigonometric equations in a given interval, including quadratic equations in ,  and  and equations involving multiples of the unknown angle. |
| **Resource links**  [**1.06 Delivery Guide**](http://www.ocr.org.uk/Images/416786-section-1.06-exponential-and-logarithms-delivery-guide-version-1-.docx) | | **Resource links**  [**1.05 Delivery Guide**](http://www.ocr.org.uk/Images/416575-section-1.05-trigonometry-delivery-guide-version-1-.docx) | |
| **7/T2** | **Prior knowledge**  *GCSE review 5.03a*  **Exponential Graphs 1.06 d** | | **Prior knowledge**  *GCSE review 7.04c*  **Differentiation 1.07 e** | |
| **1.06 g**  **1.06 h**  **1.06 i** | **Modelling with Exponentials**  Be able to solve equations of the form  for .  Be able to use logarithmic graphs to estimate parameters in relationships of the form  and , given data for  and *.*  Understand and be able to use exponential growth and decay and use the exponential function in modelling. | **1.08 a**  **1.08 b** | **Fundamental Theorem of Calculus**  Know and be able to use the fundamental theorem of calculus.  Be able to integrate  where  and related sums, differences and constant multiples. |
| **Resource links**  [**1.06 Delivery Guide**](http://www.ocr.org.uk/Images/416786-section-1.06-exponential-and-logarithms-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |
| **8/T2** | **Prior knowledge**  **Binomial Distributions 2.04 b, c** | | **Prior knowledge**  **Fundamental Theorem of Calculus 1.08 a, b** | |
| **2.05 a** | **Statistical Hypothesis Testing**  Understand and be able to use the language of statistical hypothesis testing, developed through a binomial model: null hypothesis, alternative hypothesis, significance level, test statistic, 1-tail test, 2-tail test, critical value, critical region, acceptance region, *p*-value. | **1.08 d** | **Definite Integrals**  Be able to evaluate definite integrals. |
| **Resource links**  [**2.05 Delivery Guide**](http://www.ocr.org.uk/Images/417813-section-2.05-statistical-hypothesis-testing-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |
| **9/T2** | **Prior knowledge**  **Statistical Hypothesis Testing 2.05 a** | | **Prior knowledge**  **Integration 1.08 b, d** | |
| **2.05 b** | **Binomial Hypothesis Testing**  Be able to conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context. | **1.08 e** | **Area between curve and *x*-axis**  Be able to use a definite integral to find the area between a curve and the *x*-axis. |
| **Resource links**  [**2.05 Delivery Guide**](http://www.ocr.org.uk/Images/417813-section-2.05-statistical-hypothesis-testing-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |
| **10/T2** | **Prior knowledge**  **Binomial Hypothesis Testing 2.05 b, c** | | **Prior knowledge**  **Constant Acceleration 3.02 d** | |
| **2.05 c** | **Inference**  Understand that a sample is being used to make an inference about the population and appreciate that the significance level is the probability of incorrectly rejecting the null hypothesis. | **3.02 d**  **3.02 f** | **Variable Acceleration**  derive *the constant acceleration formulae using a variety of calculus techniques:*  *by integration, e.g. .*  Be able to use differentiation and integration with respect to time in one dimension to solve simple problems concerning the displacement, velocity and acceleration of a particle |
| **Resource links**  [**2.05 Delivery Guide**](http://www.ocr.org.uk/Images/417813-section-2.05-statistical-hypothesis-testing-delivery-guide-version-1-.docx) | | **Resource links**  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |

**Term 3 (AS revision and A Level)**

| **Week** | **Ref** | **Teacher A** | **Ref** | **Teacher B** |
| --- | --- | --- | --- | --- |
| **1/T3** | **Prior knowledge**  **Probability 2.03 a, b** | | **Prior knowledge**  **Trigonometry 1.05 a, b, c** | |
| **2.03 c**  **2.03 d**  **2.03 e** | **Conditional Probability**  Understand and be able to use conditional probability, including the use of tree diagrams, Venn diagrams and two-way tables.  Understand the concept of conditional probability, and calculate it from first principles in given contexts.  Be able to model with probability, including critiquing assumptions made and the likely effect of more realistic assumptions. | **1.05 d**  **1.05 e** | **Radians and Trigonometry**  Be able to work with radian measure, including use for arc length and area of sector.  *Learners should know the formulae  and .*  *Learners should be able to use the relationship between degrees and radians.*  Understand and be able to use the standard small angle approximations of sine, cosine and tangent:  1.,  2.,  3.,  where  is in radians. |
| **Resource links**  [**2.03 Delivery Guide**](http://www.ocr.org.uk/Images/415108-section-2.03-probability-delivery-guide-version-1-.docx) | | **Resource links**  [**1.05 Delivery Guide**](http://www.ocr.org.uk/Images/416575-section-1.05-trigonometry-delivery-guide-version-1-.docx) | |
| **2/T3** | **Prior knowledge**  **Algebra and Functions 1.02 j, w**  **Differentiation 1.07 a, d**  **Integration 1.08 a** | | **Prior knowledge**  **Trigonometry 1.05 f, j** | |
| **1.02 u**  **1.02 v**  **1.02 x** | **Algebra and functions**  Understand and be able to use the definition of a function.  Understand and be able to use inverse functions and their graphs, and composite functions. Know the condition for the inverse function to exist and be able to find the inverse of a function either graphically, by reflection in the line , or algebraically.  Understand the effect of combinations of transformations on the graph of  including sketching associated graphs, describing transformations and finding relevant equations. | **1.05 g**  **1.05 h**  **1.05 i**  **1.05 k**  **1.05 o** | **Radians and Trigonometry**  Know and be able to use exact values of and  for  and multiples thereof, and exact values of for  and multiples thereof.  Understand and be able to use the definitions of secant (), cosecant () and cotangent  () and of ,  and  and their relationships to ,  and respectively.  Understand the graphs of the functions given in 1.05h, their ranges and domains.  Understand and be able to use  and .  Be able to solve simple trigonometric equations in a given interval, including quadratic equations in ,  and  and equations involving multiples of the unknown angle. |
| **Resource links**  [**1.03 Delivery Guide**](http://www.ocr.org.uk/Images/413786-section-1.03-coordinate-geometry-delivery-guide-version-1-.docx) | | **Resource links**  [**1.05 Delivery Guide**](http://www.ocr.org.uk/Images/416575-section-1.05-trigonometry-delivery-guide-version-1-.docx) | |
| **3/T3** | **Prior knowledge**  **Binomial Expansion 1.04 a** | | **Prior knowledge**  *GCSE review 6.03e*  **Polynomials 1.02 j, q** | |
| **1.04 c**  **1.04 d**  **1.04 e**  **1.04 f**  **1.04 g** | **Series and Sequences**  Be able to extend the binomial expansion of  to any rational , including its use for approximation.  Know that the expansion is valid for .  Be able to work with sequences including those given by a formula for the  term and those generated by a simple relation of the form .  Understand the meaning of and work with increasing sequences, decreasing sequences and periodic sequences.  Understand and be able to use sigma notation for sums of series. | **1.09 a**  **1.09 b**  **1.09 c** | **Numerical Methods**  Be able to locate roots of  by considering changes of sign of  in an interval of  on which  is sufficiently well-behaved.  Understand how change of sign methods can fail.  Be able to solve equations approximately using simple iterative methods and be able to draw associated cobweb and staircase diagrams. |
| **Resource links**  [**1.04 Delivery Guide**](http://www.ocr.org.uk/Images/415095-section-1.04-sequences-and-series-delivery-guide-version-1-.docx) | | **Resource links**  [**1.09 Delivery Guide**](http://www.ocr.org.uk/Images/415109-section-1.09-numerical-methods-delivery-guide-version-1-.docx) | |
| **4/T3** | **Prior knowledge**  **Series and Sequences 1.04 e, f, g** | | **Prior knowledge**  **Polynomials 1.02 q**  **Series and Sequences 1.04 e**  **Differentiation 1.07 i** | |
| **1.04 h**  **1.04 i**  **1.04 j**  **1.04 k** | **AP and GP**  Understand and be able to work with arithmetic sequences and series, including the formulae for the  term and the sum to terms.  Understand and be able to work with geometric sequences and series including the formulae for the  term and the sum of a finite geometric series.  Understand and be able to work with the sum to infinity of a convergent geometric series, including the use of  and the use of modulus notation in the condition for convergence.  Be able to use sequences and series in modelling. | **1.09 d**  **1.09 e** | **Numerical Methods**  Be able to solve equations using the Newton-Raphson method and other recurrence relations of the form .  Understand and be able to show how such methods can fail. |
| **Resource links**  [**1.04 Delivery Guide**](http://www.ocr.org.uk/Images/415095-section-1.04-sequences-and-series-delivery-guide-version-1-.docx) | | **Resource links**  [**1.09 Delivery Guide**](http://www.ocr.org.uk/Images/415109-section-1.09-numerical-methods-delivery-guide-version-1-.docx) | |
| **5/T3** | **Prior knowledge**  **Polynomials 1.02 j** | | **Prior knowledge**  **Simultaneous Equations 1.02 c**  **Forces 3.03 b, 3.03 h** | |
| **1.03 g** | **Parametric form**  Understand and be able to use the parametric equations of curves and be able to convert between cartesian and parametric forms. | **3.01 c**  **3.04 a**  **3.04 b** | **Moments**  Understand and be able to use the unit for moment (N m).  Be able to calculate the moment of a force about an axis through a point in the plane of the body.  Understand that when a rigid body is in equilibrium the resultant moment is zero and the resultant force is zero. |
| **Resource links**  [**1.03 Delivery Guide**](http://www.ocr.org.uk/Images/413786-section-1.03-coordinate-geometry-delivery-guide-version-1-.docx) | | **Resource links**  [**3.01 Delivery Guide**](http://www.ocr.org.uk/Images/412029-section-3.01-quantities-and-units-delivery-guide-version-1-.docx)  [**3.04 Delivery Guide**](http://www.ocr.org.uk/Images/417814-section-3.04-moments-delivery-guide-version-1-.docx) | |
| **6/T3** | **Prior knowledge**  **Parametric form 1.03 g** | | **Prior knowledge**  **Moments 3.04 a, b** | |
| **1.03 h** | **Modelling using parametric equations**  Be able to use parametric equations in modelling in a variety of contexts. | **3.04 c** | **Modelling using moments**  Be able to use moments in simple static contexts. |
| **Resource links**  [**1.03 Delivery Guide**](http://www.ocr.org.uk/Images/413786-section-1.03-coordinate-geometry-delivery-guide-version-1-.docx) | | **Resource links**  [**3.04 Delivery Guide**](http://www.ocr.org.uk/Images/417814-section-3.04-moments-delivery-guide-version-1-.docx) | |
| **7/T3** | **Prior knowledge**  **LDS and Sampling 2.02 a** | | **Prior knowledge**  **Differentiation 1.07 i**  **Integration 1.08 d** | |
| **2.04 e**  **2.04 f** | **Normal Distribution Model**  Understand and be able to use the normal distribution as a model.  Be able to find probabilities using the normal distribution, using appropriate calculator functions. | **1.07 t** | **Introduction to Differential Equations**  Be able to construct simple differential equations in pure mathematics and in context (contexts may include kinematics, population growth and modelling the relationship between price and demand). |
| **Resource links**  [**2.04 Delivery Guide**](http://www.ocr.org.uk/Images/415107-section-2.04-statistical-distributions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |
| **8/T3** | **Prior knowledge**  **Normal Distribution Model 2.04 e, f** | | **Prior knowledge**  **Introduction to Differential Equations 1.07 t** | |
| **2.04 d**  **2.04 g**  **2.04 h** | **Normal Distribution**  Know and be able to use the formulae  and  when choosing a particular normal model to use as an approximation to a binomial model.  Understand links to histograms, mean and standard deviation.  Be able to select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or normal model may not be appropriate. | **1.08 k** | **Analytical Solutions of Differential Equations**  Be able to evaluate the analytical solution of simple first order differential equations with separable variables, including finding particular solutions. |
| **Resource links**  [**2.04 Delivery Guide**](http://www.ocr.org.uk/Images/415107-section-2.04-statistical-distributions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |

**Term 4 (A Level)**

| **Week** | **Ref** | **Teacher A** | **Ref** | **Teacher B** |
| --- | --- | --- | --- | --- |
| **1/T4** | **Prior knowledge**  **Polynomials 1.02 j** | | **Prior knowledge**  **Proof 1.01 a** | |
| **1.02 k**  **1.02 y** | **Partial Fractions**  Be able to simplify rational expressions.  Be able to decompose rational functions into partial fractions (denominators not more complicated than squared linear terms and with no more than 3 terms, numerators constant or linear). | **1.01 d** | **Proof by contradiction**  Understand and be able to use proof by contradiction. |
| **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.01 Delivery Guide**](http://www.ocr.org.uk/Images/407055-section-1.01-proof-delivery-guide-version-1-.docx) | |
| **2/T4** | **Prior knowledge**  **Proof 1.01 b**  **Indices 1.02 a**  **Straight Lines 1.03 a** | | **Prior knowledge**  **Vectors 1.10 a** | |
| **1.02 l**  **1.02 s**  **1.02 t** | **Modulus Function**  Understand and be able to use the modulus function  Be able to sketch the graph of the modulus of a linear function involving a single modulus sign.  Be able to solve graphically simple equations and inequalities involving the modulus function. | **1.10 b** | **3D Vectors**  Be able to use vectors in three dimensions.  *i.e.* *Learners should be able to use vectors expressed as  or as a column vector .*  *Includes extending 1.10c to 1.10g to include vectors in three dimensions, excluding the direction of a vector in three dimensions.* |
| **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.10 Delivery Guide**](http://www.ocr.org.uk/Images/413780-section-1.10-vectors-delivery-guide-version-1-.docx) | |
| **3/T4** | **Prior knowledge**  **Binomial Expansion 1.04 a, b** | | **Prior knowledge**  **Vectors 1.10 b**  **Constant Acceleration 3.02 d** | |
| **1.04 c** | **Binomial Expansion**  Be able to extend the binomial expansion of  to any rational *n*, including its use for approximation | **1.10 h**  **3.02 e** | **Further Vectors and Kinematics**  Be able to use vectors to solve problems in kinematics.  Be able to extend the constant acceleration formulae to motion in two dimensions using vectors. |
| **Resource links**  [**1.04 Delivery Guide**](http://www.ocr.org.uk/Images/415095-section-1.04-sequences-and-series-delivery-guide-version-1-.docx) | | **Resource links**  [**1.10 Delivery Guide**](http://www.ocr.org.uk/Images/413780-section-1.10-vectors-delivery-guide-version-1-.docx)  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |
| **4/T4** | **Prior knowledge**  **Measures of average and spread 2.02 f**  **Normal distribution 2.04 e, f, g**  **Language of hypothesis testing 2.05 a** | | **Prior knowledge**  **Newton’s second law 3.03 c, d**  **Newton’s third law 3.03 h, I, j, k** | |
| **2.05 d** | **Hypothesis Testing using Normal Distribution**  Recognise that a sample mean,, can be regarded as a random variable. | **3.03 e**  **3.03 l** | **Resolving Forces**  Be able to extend use of Newton’s second law to situations where forces need to be resolved (restricted to two dimensions).  Be able to extend use of Newton’s third law to situations where forces need to be resolved (restricted to two dimensions). |
| **Resource links**  [**2.05 Delivery Guide**](http://www.ocr.org.uk/Images/417813-section-2.05-statistical-hypothesis-testing-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **5/T4** | **Prior knowledge**  **Normal Distribution 2.05 d** | | **Prior knowledge**  **Forces 3.03 e, l** | |
| **2.05 e** | **Hypothesis Testing using Normal Distribution**  Be able to conduct a statistical hypothesis test for the mean of a normal distribution with known, given or assumed variance and interpret the results in context. | **3.03 m**  **3.03 o** | **Forces in Equilibrium**  Be able to use the principle that a particle is in equilibrium if and only if the sum of the resolved parts in a given direction is zero.  Be able to resolve forces for more advanced problems involving connected particles and smooth pulleys. |
| **Resource links**  [**2.05 Delivery Guide**](http://www.ocr.org.uk/Images/417813-section-2.05-statistical-hypothesis-testing-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **6/T4** | **Prior knowledge**  **Gradients 1.07 d**  **Tangents 1.07 m** | | **Prior knowledge**  **Vectors 1.10 a, b, c, d**  **Kinematics 3.02 e**  **Forces 3.03 e, l** | |
| **1.07 f**  **1.07 p** | **Points of Inflection**  Understand and be able to use the second derivative in connection to convex and concave sections of curves and points of inflection.  *In particular, learners should know that:*  *1. if  on an interval, the function is convex in that interval;*  *2. if  on an interval the function is concave in that interval;*  *3. if  and the curve changes from concave to convex or vice versa there is a point of inflection.*  Be able to apply differentiation to find points of inflection on a curve. | **3.03 p**  **3.03 q**  **3.03 s**  **3.03 t**  **3.03 u** | **Resultant Forces in motion**  Understand the term ‘resultant’ as applied to two or more forces acting at a point and use vector addition in solving problems involving resultants and components of forces.  Be able to solve problems involving the dynamics of motion for a particle moving in a plane under the action of a force or forces.  Be able to represent the contact force between two rough surfaces by two components (the ‘normal’ contact force and the ‘frictional’ contact force).  Understand and be able to use the coefficient of friction and the  model of friction in one and two dimensions, including the concept of limiting friction.  Understand and be able to solve problems regarding the static equilibrium of a body on a rough surface and solve problems regarding limiting equilibrium. |
| **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **7/T4** | **Prior knowledge**  **Polynomials 1.02 j, k**  **Differentiation 1.07 i, j, k, l** | | **Prior knowledge**  **Integration 1.08 e** | |
| **1.07 q** | **Product and Quotient Rules**  Be able to differentiate using the product rule and the quotient rule. | **1.08 f** | **Area between two curves**  Be able to use a definite integral to find the area between two curves.  *Learners should understand the relationship between this method and the chain rule* |
| **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |
| **8/T4** | **Prior knowledge**  **Polynomials 1.02 j, k**  **Differentiation 1.07 i, j, k, l, q** | | **Prior knowledge**  *GCSE 7.04c*  **Definite Integrals 1.08 d** | |
| **1.07 r** | **Chain Rule**  Be able to differentiate using the chain rule, including problems involving connected rates of change and inverse functions. | **1.08 g**  **1.09 f** | **Integration as a limit of a sum**  Understand and be able to use integration as the limit of a sum.  Understand and be able to use numerical integration of functions, including the use of the trapezium rule, and estimating the approximate area under a curve and the limits that it must lie between. |
| **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx)  [**1.09 Delivery Guide**](http://www.ocr.org.uk/Images/415109-section-1.09-numerical-methods-delivery-guide-version-1-.docx) | |
| **9/T4** | **Prior knowledge**  **Trigonometry Identities 1.05 j** | | **Prior knowledge**  **Chain Rule 1.07 r** | |
| **1.05 k**  **1.05 l**  **1.05 m** | **Trigonometry Identities**  Understand and be able to use  and .  Understand and be able to use double angle formulae and the formulae for ,  and .  Understand the geometrical proofs of these formulae. | **1.08 h** | **Integration by substitution**  Be able to carry out simple cases of integration by substitution for polynomials |
| **Resource links**  [**1.05 Delivery Guide**](http://www.ocr.org.uk/Images/416575-section-1.05-trigonometry-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |
| **10/T4** | **Prior knowledge**  **Trigonometry Identities 1.05 f, g, j, k** | | **Prior knowledge**  **Constant acceleration 3.02 d**  **Vectors 1.10 c** | |
| **1.05 n**  **1.05 o**  **1.05 p**  **1.05 q** | **Trigonometry Identities**  Understand and be able to use expressions for  in the equivalent forms of  or .  *Extend their knowledge of trigonometric equations to include radians and the trigonometric identities in Stage 2.*  Be able to construct proofs involving trigonometric functions and identities.  Be able to use trigonometric functions to solve problems in context, including problems involving vectors, kinematics and forces. | **3.02 e**  **3.02 h**  **3.02 i** | **Motion in two dimensions**  Be able to extend the constant acceleration formulae to motion in two dimensions using vectors.  Be able to model motion under gravity in a vertical plane using vectors where  or .  Be able to model the motion of a projectile as a particle moving with constant acceleration and understand the limitation of this model. |
| **Resource links**  [**1.05 Delivery Guide**](http://www.ocr.org.uk/Images/416575-section-1.05-trigonometry-delivery-guide-version-1-.docx) | | **Resource links**  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |
| **11/T4** | **Prior knowledge**  **Numerical Methods 1.09 a, b, c, d, e, f** | | **Prior knowledge**  **Constant acceleration 3.02 d**  **Vectors 1.10 c** | |
| **1.09 g** | **Further Numerical Methods**  Be able to use numerical methods to solve problems in context. | **3.02 i** | **Projectile model**  Be able to model the motion of a projectile as a particle moving with constant acceleration and understand the limitation of this model.  *Includes being able to:*  *1.Use horizontal and vertical equations of motion to solve problems on the motion of projectiles.*  *2. Find the magnitude and direction of the velocity at a given time or position.*  *3. Find the range on a horizontal plane and the greatest height achieved.*  *4. Derive and use the Cartesian equation of the trajectory of a projectile.* |
| **Resource links**  [**1.09 Delivery Guide**](http://www.ocr.org.uk/Images/415109-section-1.09-numerical-methods-delivery-guide-version-1-.docx) | | **Resource links**  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |

**Term 5 (A Level)**

| **Week** | **Ref** | **Teacher A** | **Ref** | **Teacher B** |
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| **1/T5** | **Prior knowledge**  **Bivariate Data 2.02 c, d, e** | | **Prior knowledge**  **Indices 1.02 a**  **Exponentials 1.06 a, b, i**  **Differentiation 1.07 q, r**  **Integration 1.08 a** | |
| **2.05 f** | **Pearson’s product moment correlation**  Understand Pearson's product-moment correlation coefficient as a measure of how close data points lie to a straight line. | **1.07 j**  **1.07 l**  **1.08 c** | **Exponential Calculus**  Be able to differentiate  and , and related sums, differences and constant multiples.  Understand and be able to use the derivative of .  Be able to integrate ,  and related sums, differences and constant multiples. |
| **Resource links**  [**2.05 Delivery Guide**](http://www.ocr.org.uk/Images/417813-section-2.05-statistical-hypothesis-testing-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |
| **2/T5** | **Prior knowledge**  **Language of Hypothesis Testing 2.05 a**  **Pearson Product Moment Correlation 2.05 f** | | **Prior knowledge**  **Graphs of Trigonometric functions 1.05 f, g**  **Differentiation from first principles 1.07 g** | |
| **2.05 g** | **Hypothesis Testing and Correlation**  Use and be able to interpret Pearson's product-moment correlation coefficient in hypothesis tests, using either a given critical value or a *p-*value and a table of critical values.  *When using Pearson's coefficient in an hypothesis test, the data may be assumed to come from a bivariate normal distribution.* | **1.07 h**  **1.07 k**  ***(1.07 q)***  ***(1.07 r)*** | **Trigonometrical Calculus**  Be able to show differentiation from first principles for  and .  Be able to differentiate , ,  and related sums, differences and constant multiples.  *Differentiate trigonometric functions using the product rule and the quotient rule.*  *Differentiate trigonometric functions using the chain rule.* |
| **Resource links**  [**2.05 Delivery Guide**](http://www.ocr.org.uk/Images/417813-section-2.05-statistical-hypothesis-testing-delivery-guide-version-1-.docx) | | **Resource links**  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx) | |
| **3/T5** | **Prior knowledge**  **Algebra and Functions 1.02 k, l, u, v, y** | | **Prior knowledge**  **Graphs of Trigonometric functions 1.05 f, g**  **Differentiation of Trigonometric functions 1.07 k** | |
| **1.02 z** | **Functions and Modelling**  Be able to use functions in modelling. | **1.08 c** | **Trigonometrical Calculus**  Be able to integrate ,  and related sums, differences and constant multiples. |
| **Resource links**  [**1.02 Delivery Guide**](http://www.ocr.org.uk/Images/407095-section-1.02-algebra-and-functions-delivery-guide-version-1-.docx) | | **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |
| **4/T5** | **Prior knowledge**  **Parametric equations 1.03 g** | | **Prior knowledge**  **Frictional forces 3.03 r, s, t, u, v** | |
| **1.08 f** | **Integration of parametric functions**  Be able to use a definite integral to find the area between two curves defined parametrically | **3.03 v** | **Further Kinematics**  Understand and be able to solve problems regarding the motion of a body on a rough surface. |
| **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | | **Resource links**  [**3.03 Delivery Guide**](http://www.ocr.org.uk/Images/418253-section-3.03-forces-and-newton-s-laws-delivery-guide-version-1-.docx) | |
| **5/T5** | **Prior knowledge**  **Product Rule 1.07 q** | | **Prior knowledge**  **Differentiation 1.07i, t**  **Integration 1.08 d, e, f**  **Non-uniform acceleration 3.02 f**  **Vectors 1.10 h** | |
| **1.08 i**  **1.08 j** | **Integration by parts**  Be able to carry out simple cases of integration by parts.  Be able to integrate functions using partial fractions that have linear terms in the denominator. | **3.02 g** | **Further Kinematics**  Be able to extend the application of differentiation and integration to two dimensions using vectors. |
| **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | | **Resource links**  [**3.02 Delivery Guide**](http://www.ocr.org.uk/Images/416565-section-3.02-kinematics-delivery-guide-version-1-.docx) | |
| **6/T5** | **Prior knowledge**  **Differentiation 1.07 i**  **Integration 1.08 d** | | **Prior knowledge**  **Polynomials 1.02 j** | |
| **1.07 t**  **1.08 k**  **1.08 l** | **Further Differential equations**  Be able to construct simple differential equations in pure mathematics and in context (contexts may include kinematics, population growth and modelling the relationship between price and demand)  Be able to evaluate the analytical solution of simple first order differential equations with separable variables, including finding particular solutions.  Be able to interpret the solution of a differential equation in the context of solving a problem, including identifying limitations of the solution. | **1.03 g**  **1.03 h**  **1.07 s**  **1.08 f** | **Further Parametrics**  Understand and be able to use the parametric equations of curves and be able to convert between cartesian and parametric forms.  Be able to use parametric equations in modelling in a variety of contexts.  Be able to differentiate simple functions and relations defined implicitly or parametrically for the first derivative only.  Be able to use a definite integral to find the area between two curves. |
| **Resource links**  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | | **Resource links**  [**1.03 Delivery Guide**](http://www.ocr.org.uk/Images/413786-section-1.03-coordinate-geometry-delivery-guide-version-1-.docx)  [**1.07 Delivery Guide**](http://www.ocr.org.uk/Images/412031-section-1.07-differentiation-delivery-guide-version-1-.docx)  [**1.08 Delivery Guide**](http://www.ocr.org.uk/Images/412032-section-1.08-integration-delivery-guide-version-1-.docx) | |

**(A Level Revision)**

| **Week** | **Ref** | **Teacher A** | **Ref** | **Teacher B** |
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