

	Half term 1 Learning Overview	Half term 2 Learning Overview	Half term 3 Learning Overview	Half term 4 Learning Overview	Half term 5 Learning Overview	Half term 6 Learning Overview
Year 7	<ul style="list-style-type: none"> Reasoning with number Ordering numbers including integers and decimals, using inequalities and rounding to nearest 10, 100, 1000, decimal places and significant figures. Using these skills in a variety of situations. Addition and Subtraction With negatives and in a variety of contexts including bank statements, time, frequency trees and perimeter. Multiplication and Division With integers, by 10, 100, 1000, with decimals and negative numbers, using all of these skills in problems. 	<ul style="list-style-type: none"> Application of Multiplication and Division Including with powers and roots, using these to find highest common factor and lowest common multiples. This will also be applied to estimate calculations, finding the mean and other applications. Geometric Multiplication and Division Finding areas of different shapes including rectangles, parallelograms, triangles and compound shapes extending to other shapes where possible. 	<ul style="list-style-type: none"> Understanding Fractions Working with fractions to express one quantity as a fraction of another and manipulate fractions to find equivalent fractions, fractions of amounts and increases and decreases. Fractional Operations Performing calculations with fractions including addition and subtraction, multiplication and division. Shape Properties Using shape properties in different problems including with coordinates. 	<ul style="list-style-type: none"> Working with angles Including learning notation used with angles and using angles rules to find missing angles and solve problems. Percentages Working with percentages to convert between fractions, decimals and percentages. Using percentages to find quantities including percentage increase and decrease. 	<ul style="list-style-type: none"> Representing Data Using different charts and diagrams to represent data including bar and line charts, pie charts and extending into probability and finding all options for events. 	<ul style="list-style-type: none"> Algebraic Expressions Working with and forming expressions, substituting values into expressions and expanding single brackets. Algebraic Equations Solving one and two step equations extending to solving with brackets.
Year 8	<ul style="list-style-type: none"> Algebraic Manipulations Extending substitution and expanding brackets into factorising into single brackets and expanding double brackets. Sequences and order Extending solving equations to rearranging simple formulae, Looking at how these can be applied to sequences and finding the nth term of sequences. 	<ul style="list-style-type: none"> Angle Reasoning Create scale drawings and extending angle knowledge into bearings and parallel lines 2D Shape Application Extending students' knowledge of area of trapeziums, circles and then to find the surface area. Ratio Dividing an amount into a given ratio. Working with ratio information given to find missing parts. 	<ul style="list-style-type: none"> Ratio Continuation from previous half term. Compound units Working with speed, distance and time to solve problems and calculate units, then extending to creating distance time graphs. Working with density mass and volume to solve problems. 	<ul style="list-style-type: none"> Direct and Inverse Proportion Using direct proportion to solve problems with recipes and best buy. Using graphs to convert measurements and currency. Reasoning in 3D and understanding Capacity Creating nets and drawing plans and elevations of 3D solids. Extending to finding the volume of prisms and cylinders. 	<ul style="list-style-type: none"> Working with Data Calculating and using the appropriate average for different situations. Extending to finding averages from frequency tables. Representing data on scatter graphs and frequency polygons. 	<ul style="list-style-type: none"> Working in the Cartesian plane Using coordinates in problems and then extending to draw linear graphs. Constructions and Loci Use compasses and protractors to perform constructions including perpendicular bisector, angle bisector and to construct triangles. Algebra Extending solving equations to solve simultaneous equations both algebraically and graphically.

<p>Year 9</p>	<p>E</p> <ul style="list-style-type: none"> Basic Number Building upon students' knowledge on place value negative numbers, inequalities, using the four operations with integers and decimals including using the order of operations. Measures and Scale Drawings Converting between metric numbers and then moving on to converting between imperial units using these in scale drawings and then plans and elevations. Charts, Tables and Averages Building upon students' prior knowledge to represent data with pictograms, bar charts and vertical line graphs, then moving on to interpreting this data and find averages. <p>H</p> <ul style="list-style-type: none"> Basic Number Solving real life problems involving multiplication and division. Multiplication and division of decimals. Prime factors and using this to find the HCF and LCM. Calculations with negative numbers. Fractions, Ratio and Proportion Writing one quantity as a fraction of another, calculating with fractions (all four operations) Increasing and decreasing by a percentage and writing one quantity as a percentage of another. Statistical Diagrams and Averages Draw and interpret pie charts and line graphs, then using statistical measures for discrete and continuous 	<p>E</p> <ul style="list-style-type: none"> Angles Extending pupils' knowledge of angles rules including in polygons, parallel lines and using the properties of polygons to find missing angles. Number Properties Finding multiples, factors and prime factors, moving onto the HCF and LCM, special numbers such as square numbers and square roots. How to use a calculator will also be covered. <p>H</p> <ul style="list-style-type: none"> Ratio and Proportion Simplifying ratios, dividing into a given ratio, and completing calculations with a given ratio. Direct proportion problems including best buys. Solving problems including density, mass and volume. Calculating compound interest and finding repeated percentage change. Angles Using angle facts to find missing angles in polygons, parallel lines, and special quadrilaterals. Using scale drawings and bearings to solve problems. Transformations, constructions and loci Demonstrating that two triangles are congruent. Performing transformations (reflection, rotation, translation and enlargement) and a combination of these. Constructing bisectors, loci and solving problems with loci. Constructing plans and elevations. 	<p>E</p> <ul style="list-style-type: none"> Approximations Rounding wholes numbers, decimals and approximating calculations. Decimals and Fractions Calculating with decimals and fractions. Finding the reciprocal of fractions and using a calculator with fractions. <p>H</p> <ul style="list-style-type: none"> Algebraic Manipulation Factorising into single brackets, quadratic expansion including squares. Expanding more than two brackets. Extending to factorising quadratics including with a coefficient bigger than 1. Changing the subject of a formula. 	<p>E</p> <ul style="list-style-type: none"> Linear Graphs Drawing straight line graphs by plotting points. Looking at the properties of straight line graphs including the gradient, intercept and the equations of a line, extending to parallel lines. Graphs will be used to solve simultaneous equations. Real life uses of graphs for example conversion graphs and formulae representations. Expressions and Formulae Substituting into expressions and formulae. Expanding and factorising single brackets, this will be extended to quadratic expansion and factorisation. Changing the subject of a formulae will also be covered. <p>H</p> <ul style="list-style-type: none"> Length, Area and Volume Calculating the area of parallelograms and trapeziums. Finding the circumference and area of a circle extending to sectors. Finding the volume of prisms, cylinders, pyramids, cones and spheres. Linear Graphs Drawing linear graphs by finding points, finding the gradient of a line and using this to find the equation extending to parallel and perpendicular lines. Drawing graphs using the gradient and intercept method and finding the equation of the line from its graph. Using graphs for real life situations and then solving simultaneous equations using their graphs. 	<p>E</p> <ul style="list-style-type: none"> Ratio, Speed and Proportion Simplifying ratios, writing ratios as a fractions, divide into given ratios and solving problems with part information. Speed, distance, time calculations will be used to find the average speed, distance travelled and the time taken for a journey. Direct proportion problems will be looked at along with best buy problems. Perimeter and Area Finding the area of rectangles, triangles, parallelograms, trapeziums and circles including giving answers in terms of pi. <p>H</p> <ul style="list-style-type: none"> Right angled Triangles Calculating the longest and shortest side using Pythagoras' theorem and then applying to different situations including in 3D. Using trigonometry to find missing angles and sides including in problems involving bearing and isosceles triangles. Similarity Using similarity to find missing lengths and then extending to area and volume. Exploring and applying Probability Understanding experimental probability and mutually exclusive events. Using probability to work out the number of times something should occur. Using two way tables and tree diagrams to calculate probability. 	<p>E</p> <ul style="list-style-type: none"> Transformations and Vectors Rotational symmetry, rotations about a given point, reflections including with given equation of line, translations, enlargements from a given point and combinations of transformations. Adding and subtracting vectors. Probability and Events Calculating probabilities of an event. Looking at experimental probability and how this compares to theoretical probability. Expectation of the number of times an event will occur and looking at number of different ways an outcome can happen. <p>H</p> <ul style="list-style-type: none"> Powers and Standard Form Using laws and indices to calculate with powers. Writing very small and large numbers in standard form and then use this to perform calculations. Equations and Inequalities Solving linear equations extending to those with fractions. Solving linear simultaneous equations using the substitution, elimination and graphical method. Solving inequalities and solve other equations using trial and improvement.
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	<p>data. Drawing scatter diagrams.</p> <ul style="list-style-type: none"> Number and Sequences Finding the nth term of linear and quadratic sequences and looking at special sequences such as square numbers. 					
<p>Year 10</p>	<p><u>E</u></p> <ul style="list-style-type: none"> Volume and Surface Area of Prisms Finding volumes of prisms including cylinders. Linear Equations Solving linear equations including with brackets and where there are unknowns on both sides. Percentages and compound Measures Convert between fractions, decimals and percentages. Calculating percentages including with percentage increase and decrease and reverse percentages. Writing one number as a percentage of another and looking at compound measures like density, mass and volume. Percentages and Variation Simple interest and compound interest will be used to solve problems extending to reverse percentages. Direct proportion and inverse proportion problems will be covered. <p><u>H</u></p> <ul style="list-style-type: none"> Counting Accuracy, powers and surds Converting recurring decimals to fractions, estimating powers and roots and calculations with negative and fractional indices. Calculations with surds including simplifying, multiplying and rationalising 	<p><u>E</u></p> <ul style="list-style-type: none"> Representation and Interpretation Looking at how to take samples then moving to pie charts scatter diagram and finding averages from grouped data. Constructions and Loci Constructing triangles, bisectors and loci will be covered extending to problems involving these. <p><u>H</u></p> <ul style="list-style-type: none"> Combined Events Working out the probability of two outcomes or events occurring at the same time. Using tree diagrams to work out the probability of combined events, using and or rules to work these out and then extending o conditional probability. Properties of Circles Using circle theorems to find missing angles and solve problems. 	<p><u>E</u></p> <ul style="list-style-type: none"> Curved Shapes and Pyramids Finding the area and perimeter of sectors, then finding volumes of pyramids cones and spheres. Number and Sequences Looking for patterns in numbers finding the nth term of a linear sequence and then looking at special sequences like the Fibonacci sequence. Right Angled Triangles Using Pythagoras’ theorem to find longest and shorter sides, then applying to different situations. Finding missing sides and angles using trigonometry, then extending this to use bearings. <p><u>H</u></p> <ul style="list-style-type: none"> Variation Solving direct and inverse proportion problems algebraically. Triangles Using trigonometry to find missing sides and angles in non-right angled triangles. Using the sine rule to find the area of a triangle. 	<p><u>E</u></p> <ul style="list-style-type: none"> Congruence and Similarity Demonstrating congruency and then using similarity to find missing sides. Combined Events Working out probability of two or more events occurring. Looking at how we can use two way tables and venn diagrams with probability. Using tree diagrams to find probabilities in combined events. <p><u>H</u></p> <ul style="list-style-type: none"> Graphs Drawing distance –time and velocity-time graphs and using these to solve problems. Using graphs to estimate the rate of change. Finding the equation of a tangent to a circle. Looking at non-linear graphs and how transformations effect the graphs. 	<p><u>E</u></p> <ul style="list-style-type: none"> Powers and Standard form Write numbers as powers of another. Use laws of indices to calculate with numbers in index form. Writing very large or small numbers in standard form and calculating with these. Simultaneous Equations and Linear Inequalities Solve simultaneous equations using the elimination and substitution methods. Using simultaneous equations to solve problems. Solving inequalities. <p><u>H</u></p> <ul style="list-style-type: none"> Algebraic Fractions and Functions Simplifying and calculating with algebraic fractions and then extending to solve equations. Changing the subject of a formula where the subject appears more than once. Introducing and using function notation and then extending to using this to find composite functions. Use iterations to solve equations. 	<p><u>E</u></p> <ul style="list-style-type: none"> Non-linear Graphs Drawing distance-time graphs, plotting quadratic graphs, cubic and reciprocal graphs. Factorising quadratics and then extending to solving quadratics understanding how this relates to the quadratic graph. <p><u>H</u></p> <ul style="list-style-type: none"> Vector Geometry Add and subtract vectors and use them to solve geometric problems.

	<p>the denominator. Finding error intervals for rounding numbers and solving problems involving these.</p> <ul style="list-style-type: none"> • Quadratic Equations Plotting quadratic graphs, then moving to solve quadratic equations using factorising, the quadratic formula and completing the square. Linking the solutions of quadratics to the specific points on their graph. Solving simultaneous equations with a quadratic using the graph and algebraically. Solving quadratic inequalities. • Sampling and more complex Diagrams Understand sampling, creating frequency polygons, cumulative frequency diagrams, box plots and histograms. 					
<p>Year 11</p>	<p><u>E</u></p> <ul style="list-style-type: none"> • Number strands Revising prime factors, error intervals, fraction operations, fraction, decimal and percentages and estimation. • Algebra Strands Revising expanding and Simplifying, factorising, substitution, forming and solving equation, changing the subject and simultaneous equations • Geometry Strands Revising Area and perimeter and volume <p><u>H</u></p> <ul style="list-style-type: none"> • Number Revising Prime Factor decomposition, Recurring Decimals fractional operations and upper and lower bounds • Algebra 	<p><u>E</u></p> <ul style="list-style-type: none"> • Geometry Revising all angle rules and circles. • Data strand Revising averages from tables, scatter graphs, pie charts, frequency trees, sample space diagrams and tree diagrams. • Ratio and Proportion Strand Revising Ratio, interest, proportion, best buys, percentages, similar shapes, speed, distance and time. <p><u>H</u></p> <ul style="list-style-type: none"> • Continuation from data module last term. • Ratio and proportion Revising Ratio, percentages, interest, direct and inverse proportion and compound units. 	<p><u>E</u></p> <ul style="list-style-type: none"> • Geometry strand Revising Transformations, Pythagoras, Trigonometry, bearings, plans and elevations and constructions • Algebra Strand Revising Inequalities and Sequences and drawing graphs <p><u>H</u></p> <ul style="list-style-type: none"> • Geometry Revising Transformations, Pythagoras, and Trigonometry (including non-right-angled triangles). • Algebra Revising Quadratic sequences, linear and quadratic graphs and finding the equation of a line. 	<ul style="list-style-type: none"> • Gap Analysis of the assessments Revising over topics which students have struggled with on the exam. 	<ul style="list-style-type: none"> • Gap Analysis of the assessments Revising over topics which students have struggled with on the exam. 	

	<p>Revising Forming and solving equations, simultaneous equations, changing the subject of a formula, functions, algebraic fractions, quadratics, iteration and expanding binomials.</p> <ul style="list-style-type: none"> Geometry Revising Perimeter, area and volume, angles in polygons, similar shapes, vectors and circle theorems. Data Revising Mean from tables, cumulative frequency, box plots, histograms, tree diagrams and venn diagrams. 					
Year 12	<ul style="list-style-type: none"> Surds Using and manipulating surds and working with indices. Problem Solving Solving problems, writing mathematically and proof. Quadratic equations Drawing and sketching quadratics, solving quadratic equations using all methods. Polynomials Add and subtract polynomials, multiply by expanding brackets and understand key features of a graph of a polynomial. Divide a polynomial and use the factor theorem to factorise the polynomial and find missing coefficients. Trigonometry Using trigonometry for right angled triangles and using these to derive the exact values. Using trigonometric identities to solve trig equations. Use trigonometry with non-right-angled triangles. Equations and inequalities 	<ul style="list-style-type: none"> Graphs Using function notation and recognise and sketch graphs and sketch graphs after the effects of a transformation. Coordinate Geometry Find the midpoint and distance between two points, find the gradient and find the equation of a line including of parallel and perpendicular lines. Find the intersection between two lines. Find the equation of a circle and find the centre and radius of a circle, using this to then find the intersection between a curve and a line. Differentiation Finding the gradient of a tangent from limits, then using standard results. Extending differentiation to find the equation of tangents and normal. Using differentiation to decide if a function is increasing or decreasing and using higher order derivatives to find the 	<ul style="list-style-type: none"> Binomial expansion Use the binomial expansion to expand to a positive integer power. Use the beginning of an expansion to find approximations. Integration Integrate functions and understand it as the reverse of differentiation. Evaluate indefinite integrals and use these to find the area under a curve. Exponentials and Logarithms Understand exponential functions, sketch their graphs and use to model real life situations. Understand logarithms as the inverse of exponentials and use the laws of logarithms to solve equations. Vectors Work with vectors to solve geometric problems. <p><u>FM</u></p> <ul style="list-style-type: none"> Graphs Understand and use the language of graphs. Identify 	<ul style="list-style-type: none"> Kinematics Use the language of motion, draw and interpret distance-time and speed-time graphs, using these to solve problems. Use the equations of motion. Probability Finding the probability of events and using these in a range of situations to solve problems. <p><u>FM</u></p> <ul style="list-style-type: none"> Forces and Motion Work with vectors and Newton's laws of motion to solve problems involving forces in equilibrium and to find resultant forces. Impulse and Momentum Find the loss of kinetic energy during a direct impact, using the conservation of energy and Newton's law of impact. Friction Understand how friction can be modelled and use this in force diagrams along with 	<ul style="list-style-type: none"> Forces and Newton's laws of Motion Create force diagrams, understand and use Newton's laws of motion. Solve problems involving pulleys and connected objects. Variable acceleration Using differentiation to find the velocity and displacement of an object with variable acceleration. Data Collection Understand the problem solving cycle. Understand different sampling methods Binomial distribution Understand when the binomial distribution can be used and use it to calculate probabilities of problems. <p><u>FM</u></p> <ul style="list-style-type: none"> Dimensional analysis of forces Find the dimensions of a quantity in terms of T, L and M. Use dimensions of a quantity to determine its units. Circular Motion 	<ul style="list-style-type: none"> Data Processing representation and interpretation Present different types of data, process and interpret this data including finding the variance and standard deviation. Hypothesis Testing Perform hypothesis testing understanding key terms and when to use a two tailed test. <p><u>FM</u></p> <ul style="list-style-type: none"> Vectors 1 Using the scalar product to express the equation of a plane and then exploring intersecting planes. Series and Induction Using partial fractions to apply the method of differences and reviewing proof by induction Matrices_1 Finding the determinant of a 3x3 matrix and using this to solve simultaneous equations in three unknowns. Factorisation f

	<p>Solving simultaneous equations and inequalities.</p> <p><u>FM</u></p> <ul style="list-style-type: none"> • Matrices and Transformations Performing calculations with matrices and how to use matrices to represent transformations. • Matrices and inverses Find the determinant of a matrix and use this to find the inverse of a matrix. Use this to solve simultaneous equations. • Intro to complex numbers Understand complex numbers and solve quadratic equations where the roots are complex. Calculate with complex numbers (adding, subtracting multiplying and dividing) • Sequences and series Find the sum of series using standard formulae. Use the method of differences to find sums. Use proof by induction. Use Maclaurin series expansion for approximations. • Rational functions and further algebra Sketch graphs of rational functions. Solve inequalities of the same form. • Conics Sketching graphs of curves and using transformations with these curves. 	<p>minimum and maximum of a function.</p> <p><u>FM</u></p> <ul style="list-style-type: none"> • Hyperbolic Functions Know the definitions of hyperbolic functions and their inverses. • Complex numbers and geometry Find the modulus and argument of a complex number. Calculate with complex numbers in the modulus-argument form. Represent loci of complex numbers. • Roots of Polynomials Know the relationship between roots and coefficients of quadratics, cubics and quartic equations. Solve polynomials with complex roots. • Polar Coordinates Convert between Cartesian coordinates and polar coordinates. Sketch curves in the polar form. • Vectors and 3D space Find the angle between two vectors, find the vector equation of a line and find the distances from lines. 	<p>and use properties of graphs e.g. Eulerian.</p> <ul style="list-style-type: none"> • Solve network optimisation problems using spanning trees with Prim’s and Kruskal’s algorithms. Solve route inspection problems and the travelling salesperson problems. • Linear Programming Formulate constrained optimisation problem and solve using graphical methods. • Critical Path analysis Construct, represent and interpret a precedence network using activity-on-node. Determine earliest start times and latest finish times. • Network flows Interpret flow problems represented by a network of directed nodes. Use and interpret maximum flow-minimum-cut theorem. • Game theory Understand, interpret and construct pay off matrices. Find play safe strategies Identify and make use of dominated strategies. Find optimal mixed strategies for a game including use of graphical methods. • Binary Operations Understand and use binary operations. Construct a Cayley table for a given set and binary operation. 	<p>Newton’s laws of motion to solve problems.</p> <ul style="list-style-type: none"> • Work energy and power Calculate work and energy including with a variable force and using gravitational potential energy. 	<p>Understand the language and notation with circular motion.</p> <ul style="list-style-type: none"> • Hooke’s Law Apply Hooke’s law to strings and springs and find the tension in them. Calculate the energy stored in a spring or string. Understand when Hooke’s law is not applicable. • Further Calculus Calculate volumes of revolution and find the mean value of a function. 	<p>determinants sing row an column operations.</p> <ul style="list-style-type: none"> • Further Algebra and graphs Exploring graphs with oblique asymptotes, modulus and reciprocal graphs using these to solve equations and inequalities. • Conics Extending knowledge of conics to include more transformations. • Polar Coordinates Using knowledge of polar coordinates to find the area enclosed by a polar curve.
<p>Year 13</p>	<ul style="list-style-type: none"> • Proof Expanding knowledge on proofs to include topics covered in year 12. • Sequences and Series 	<ul style="list-style-type: none"> • Further Algebra Extending knowledge of binomial expansion. Introducing and using partial fractions • Integration 	<ul style="list-style-type: none"> • Parametric Equations Drawing graphs from parametric equations, writing in Cartesian form and differentiation with parametric equations. 	<ul style="list-style-type: none"> • Kinematics Extending knowledge of motion in one direction to two or three dimensions. • Forces and Motion 	<p>Revision</p> <p><u>FM</u></p> <ul style="list-style-type: none"> • Game theory 	<p>Exams</p>

<p>Introducing new terminology and using these with arithmetic and geometric series.</p> <ul style="list-style-type: none"> • Trigonometry Introduction to radians and use with arc length and area of a sector, also use with small angle approximations • Differentiation Introduction to new methods of differentiation, chain rule, product rule and quotient rule. • Functions Extending knowledge of composite functions and introducing the modulus function. • Further Differentiation Differentiation of exponentials, logarithms and trigonometric functions and introducing implicit differentiation. • Trigonometric Functions Introduction to reciprocal trigonometric functions, working with trig identities and equations and solving equations in radians <p><u>FM</u></p> <ul style="list-style-type: none"> • Vectors 1 Using the scalar product to express the equation of a plane and then exploring intersecting planes. • Series and Induction Using partial fractions to apply the method of differences and reviewing proof by induction • Further Algebra and graphs Exploring graphs with oblique asymptotes, modulus and reciprocal graphs using these to solve equations and inequalities. • Conics 	<p>Extending previous knowledge of integration to include more methods including integration by substitution and integration by parts.</p> <ul style="list-style-type: none"> • Trigonometric Identities Using previous knowledge of trigonometry to extend to the compound angle and double angle formulae and to write trigonometric function is a particular form. • Differential Equations Introducing differential equations and learning how to solve them. <p><u>FM</u></p> <ul style="list-style-type: none"> • Vectors 2 Applying vectors knowledge to lines and planes and finding the vector product. • Complex Numbers Introducing De Moivre's theorem and use this with finding the nth roots of complex numbers and finding multiple angle identities. Writing complex numbers in complex form. • Series and Limits Using Maclaurin series for standard functions and approximations. Using this to evaluate limits of series • Numerical Methods Exploring methods for numerical integration and Euler's method. • Further Calculus Integration with improper integrals. Looking at calculus applied to inverse Trigonometrical functions. Further integration methods 	<ul style="list-style-type: none"> • Numerical Methods Learning to solve equations numerically and introducing the Newton-Raphson Method and numerical integration • Vectors Extending knowledge of vectors to begin solving problems in 3D • Probability Extending knowledge of probability into more complex problems. • Statistical Distributions Looking into discrete random variables and then the normal distribution • Statistical Hypothesis Testing Using the Normal distribution with hypothesis testing and experiments. After exploring bivariate data in particular correlation. <p><u>FM</u></p> <ul style="list-style-type: none"> • Hyperbolic Functions Extending knowledge of hyperbolic functions to include identities and inverse hyperbolic functions. Then using calculus with hyperbolic functions • Further Integration Extending previous knowledge of integration to include more methods. Including two limits and using the reduction formulae. Then applying knowledge to find curved lengths and surface areas. • First order ODEs Creating first order differential equations by modelling rates of change. Solve 1st ODE by separation of variables and then using integrating factors and integration by substitution • Second order ODEs 	<p>Resolving forces and finding resultant forces on an inclined plane. Using Newton's second Law in two dimensions.</p> <ul style="list-style-type: none"> • Moments Forces with rigid bodies • Projectiles Introduction to equations used in projectile motion and then using these to solve problems • Friction Introducing friction into problems. <p><u>FM</u></p> <ul style="list-style-type: none"> • Work energy and power Extending knowledge to use with working in vectors and forces in equilibrium. Finally we will be Finding resultant forces. • Impulse and Momentum Extending knowledge to more than one dimension • Dimensional Analysis Using knowledge to explore dimensional consistency, the method of dimensions and finding the form of the relationship. • Circular Motion Using previous knowledge to look at the conical pendulum and banked tracks. Then extending to variable motion. • Moments and forces Using previous knowledge to apply to a force which acts at an angle and to toppling and sliding problems. • Centre of mass Using knowledge to know the positions of the centre of mass of simple shapes. Extending to centre of mass of 2 and 3 dimensional objects and of plane regions. • Graphs 	<p>Using previous knowledge to convert games into linear programming problems.</p> <ul style="list-style-type: none"> • Groups Introducing the language of groups and extending to cyclic and non-cyclic groups,
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	<p>Extending knowledge of conics to include more transformations.</p> <ul style="list-style-type: none"> • Polar Coordinates Using knowledge of polar coordinates to find the area enclosed by a polar curve. • Matrices 2 Extending knowledge of matrices to use eigenvalues and eigenvectors and how to diagonalise a Matrix. 		<p>Introducing higher order of differential equations and different types of these including Auxiliary equations with complex roots, simple harmonic motion, non-homogeneous Des and systems of differential equations.</p>	<p>Extending knowledge of graphs to isomorphisms and using Kuratowski's theorem.</p> <ul style="list-style-type: none"> • Linear Prgoramming Using the simplex algorithm to solve linear programming problems • Critical path analysis Using Gantt charts and resource histograms to help solve problems • Network flows Extending knowledge to augment flows and make refinements. 		
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