

Programme of Learning – Overview

Key Stage 3		
Year title:	Y7 Scheme of Work	Year group: 7
Autumn Term 1:	Spring Term 1:	Summer Term 1:
Intent and composite knowledge (overview):	Intent and composite knowledge:	Intent and composite knowledge (overview):
Unit 1 – Using Number	Unit 7 – Working with Numbers	Unit 13 - Probability
<ul style="list-style-type: none"> • read and use calendars • read and use 12-hour and 24-hour clocks • convert between 12-hour and 24-hour systems • work out everyday money problems • carry out calculations from information given in tables and charts • use a number line to order positive and negative whole numbers • solve problems involving negative temperatures • to use and apply comparison symbols such as > (greater than) and < (less than) • carry out additions and subtractions involving negative numbers • use a number line to calculate with negative numbers • carry out multiplications and divisions involving negative numbers 	<ul style="list-style-type: none"> • recognise and use square numbers up to 225 (15²) • recognise and use square roots up to $\sqrt{225}$ • round numbers to the nearest whole number 10, 100 or 1000 • use the conventions of BIDMAS to carry out calculations • round numbers to more than one decimal place • round numbers to one or two significant figures LARGE AND SMALL. • use rounding to estimate answers to calculations, to spot possible errors 	<ul style="list-style-type: none"> • know the vocabulary of probability • know and use the 0 – 1 probability scale • work out probabilities based on equally likely outcomes • learn about and understand experimental probability • calculate probability from experimental data. • understand the difference between theoretical and experimental probability • use sample space diagrams and lists to work out the probability of a combined event • compare and use experimental and theoretical probability
Unit 2 - Algebra	Unit 8 - Equations	Unit 14 - Statistics
<ul style="list-style-type: none"> • use algebra to write simple expressions • substitute numbers into expressions to work out their value • apply arithmetic rules (+-) to algebraic expressions • use substitution in the context of formulae • construct formulae from contextual situations • recognise equivalent expressions • apply arithmetic rules (x ÷) to algebraic expressions • simplify expressions involving brackets 	<ul style="list-style-type: none"> • find missing numbers in simple calculations • understand what an equation is • solve equations involving one operation • solve equations involving two operations • use algebra to set up and solve equations • solve equations involving brackets • solve equations that include fractions and decimals 	<ul style="list-style-type: none"> • calculate and use the mode, median and range of a set of data • calculate and use the mean average of a set of data • be able to read and interpret different statistical diagrams • create and use a tally chart • understand how to collect, use and compare data • understand continuous data and use grouped frequency
Unit 3 - Sequences	Unit 9 - Percentages	Unit 15 – Interpreting Data
<ul style="list-style-type: none"> • use function machines to generate inputs and outputs • recognise, describe and generate linear sequences • identify missing terms in a sequence • use given inputs and outputs to work out a function • explore square and triangular numbers as sequences • know and generate the Fibonacci sequence and Pascal's triangle • identify the nth term of a linear sequence • use the nth term to work out any term in a sequence 	<ul style="list-style-type: none"> • understand what a percentage is • understand the equivalence between some simple fractions and percentages • find a fraction of a quantity • find a percentage of a quantity • write a percentage as a decimal • use a calculator to find a percentage of a quantity using multipliers • understand and use percentages greater than 100% • work out the result of a percentage change 	<ul style="list-style-type: none"> • read data from pie charts, where the data is given in simple sectors • use a scaling method to draw a pie chart • use charts and diagrams to interpret data. • use the averages and range to compare and interpret data sets • construct and interpret pie charts
Summative assessment:	Summative assessment:	Summative assessment:
3 x Unit Assessments	3 x Unit Assessments	3 x Unit Assessments

Autumn Term 2:	Spring Term 2:	Summer Term 2:
Intent and composite knowledge (overview):	Intent and composite knowledge :	Intent and composite knowledge (overview):
Unit 4 – Co-ordinates & Graphs	Unit 10 – Perimeter, Area & Volume	Unit 16 – 3D Shapes
<ul style="list-style-type: none"> • understand and use coordinates to locate position points in all four quadrants • draw a graph for a simple rule • draw a graph for a simple relationship • recognise and draw line graphs with fixed values of x and y e.g. $x = 4$ and $y = 6$ • learn how graphs can be used to represent real-life situations • draw and use real-life graphs • recognise and draw the graphs of $y = x$ and $y = -x$ • recognise and draw lines of the form $y = ax$ • recognise and draw graphs of the form $x + y = a$ 	<ul style="list-style-type: none"> • measure and draw lines accurately • work out or estimate the perimeter and area of 2D shapes by counting squares • work out the perimeter and area of 2D shapes by using the appropriate formula • work out the perimeter and area of compound rectilinear shapes by using simple formulae • calculate the volume of cubes and cuboids • calculate the surface area of cubes and cuboids • calculate the area of a triangle. • calculate the area of a parallelogram • calculate the area of a trapezium 	<ul style="list-style-type: none"> • know how to count the faces, edges and vertices on a 2D shape • draw nets for 3D shapes • know the names and properties of common 3D shapes • use isometric paper to represent shapes made from cubes • draw nets for 3D shapes • construct 3D shapes from nets, including more complex shapes • establish the rule connecting faces, edges and vertices in 3D shapes (Euler)
Unit 5 – Integers & Decimals	Unit 11 – Angles	Unit 17 - Symmetry
<ul style="list-style-type: none"> • multiply and divide decimal numbers by powers of 10 • choose a written method for multiplying two numbers together • use written methods to carry out multiplications accurately • choose a written method for dividing one number by another • use written methods to carry out divisions accurately • add and subtract decimal numbers • convert between common metric units • use measurements in calculations • recognise and use appropriate metric units • multiply and divide decimal numbers 	<ul style="list-style-type: none"> • use a compass to give directions • know the different types of angles • use a protractor to measure an angle • use a protractor to draw an angle • calculate angles at a point • calculate angles on a straight line • calculate vertically opposite angles • know that the angle sum in a triangle is 180° • know that the angle sum in a quadrilateral is 360° • understand the properties of parallel, intersecting and perpendicular lines • understand and use the properties of a triangle • understand and use the properties of quadrilaterals • calculate angles in parallel lines • calculate missing angles involving algebra 	<ul style="list-style-type: none"> • recognise shapes that have reflective symmetry • draw lines of symmetry on a shape • recognise shapes that have rotational symmetry • find the order of rotational symmetry for a shape • understand how to reflect a shape • use a coordinate grid to reflect shapes • understand how to tessellate shapes • use a coordinate grid to reflect shapes in lines, including $y = x$
Unit 6 - Fractions	Unit 12 - Ratio	
<ul style="list-style-type: none"> • write fractions in their simplest form • compare and order two fractions • add and subtract fractions with the same denominator • convert between mixed numbers and improper fractions • add and subtract simple mixed numbers with the same denominator • add and subtract fractions with different denominators • add and subtract simple mixed numbers with different denominators 	<ul style="list-style-type: none"> • understand ratio notation • write a ratio as simply as possible • use ratios to find missing quantities • share a ratio in a given quantity • write ratios in the form $1 : x$ • understand the connection between ratios and fractions • use and apply the connection between ratios and fractions as a proportionality relationship • write ratios to compare more than two items 	
Summative assessment:	Summative assessment:	Summative assessment:
3 x Unit Assessments	3 x Unit Assessments	2 x Unit Assessments

Programme of Learning – Overview

Key Stage 3		
Year title:	Y8 Scheme of Work	Year group: 8
Autumn Term 1 title:	Spring Term 1 title:	Summer Term 1 title:
Intent and composite knowledge (overview):	Intent and composite knowledge:	Intent and composite knowledge:
Unit 1 – Working with Numbers	Unit 7 – Number	Unit 12 - Proportion
<ul style="list-style-type: none"> carry out additions and subtractions involving negative numbers carry out multiplications and divisions involving negative numbers know and use powers and roots understand and use HCF and LCM (from lists) be able to identify the prime factors of any integer understand and use HCF and LCM (from prime factors) be able to use and apply number skills in a real-life situation 	<ul style="list-style-type: none"> multiply and divide by positive powers of 10 round numbers to a given decimal place multiply and divide by negative powers of 10 multiply and divide with combinations of large and small numbers mentally round to a specific number of significant figures estimate answers to problems write a large number in standard form write a small number in standard form multiply with numbers in standard form 	<ul style="list-style-type: none"> understand the meaning of direct proportion find missing values in problems involving proportion represent direct proportion graphically and algebraically know what is meant by inverse proportion use graphical and algebraic representations of inverse proportion recognise the difference between direct and inverse proportion in problems work out missing values
Unit 2 – Fractions	Unit 8 – Equations & Formulae	Unit 13 – Interpreting Data
<ul style="list-style-type: none"> add and subtract fractions multiply a fraction by an integer add and subtract mixed numbers multiply a mixed number by an integer divide a unit fraction by an integer divide an integer by a unit fraction divide a fraction or a mixed number by an integer divide a mixed number by a unit fraction 	<ul style="list-style-type: none"> solve simple equations solve equations where the answers are fractions or negative numbers substitute values into a variety of formulae solve equations involving brackets solve equations with the variable on both sides solve equations with fractions and fractional coefficients solve simple equations involving squares change the subject of a formula, including formulae involving squares 	<ul style="list-style-type: none"> interpret different charts seen in the media interpret a pie chart use a scaling method to draw pie charts read scatter graphs understand correlation construct scatter graphs and use a line of best fit to describe data trends draw pie charts relative to data size interpret and criticise a variety of graphs.
Unit 3 – Geometry and Scales		
<ul style="list-style-type: none"> calculate angles in parallel lines understand how to translate a point or a shape understand how to rotate a point or a shape enlarge a 2D shape by a scale factor construct the perpendicular bisector of a line construct the angle bisector of a line recognise congruent shapes know the conditions for recognising congruent triangles understand and use scale diagrams use ratio to compare lengths, areas and volumes of 2D and 3D shapes enlarge a 2D shape by a fractional scale factor construct a perpendicular to a line from or at a given point solve geometric problems using the rules of congruency use and apply skills and knowledge of area, ratio and data handling in a real-life context. 		
Summative assessment:	Summative assessment:	Summative assessment:
3 x Unit Assessments	2 x Unit Assessments	2 x Unit Assessments

Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge (overview):	Intent and composite knowledge:	Intent and composite knowledge:
Unit 4 - Algebra	Unit 9 – Circles	Unit 14 – Comparing Data
<ul style="list-style-type: none"> • simplify algebraic expressions involving the four operations of arithmetic • simplify expressions by collecting up like terms • multiply out brackets in an expression • identify and manipulate algebraic expressions • write algebraic expressions involving powers • use and apply algebraic manipulation skills in a range of contexts (forming expressions) 	<ul style="list-style-type: none"> • know the definition of a circle and be able to name the parts of a circle • calculate the circumference of a circle • calculate the area of a circle • calculate the perimeter and area of more complex shapes which include circles. 	<ul style="list-style-type: none"> • create a grouped frequency table from raw data • understand and calculate the mean average of data • interpret frequency diagrams • draw a frequency diagram from a grouped frequency table • use the mean and range to compare data from two sources • understand when each different type of average is most useful • recognise when a statistical chart may be misleading
Unit 5 – Sequences	Unit 10 – Surface Area & Volume	Unit 15 - Probability
<ul style="list-style-type: none"> • know and understand the Fibonacci sequence • use algebra with function machines • find the nth term of sequences • use the nth term of a sequence • find the nth term of simple quadratic sequences 	<ul style="list-style-type: none"> • use a formula to work out the area of a rectangle • work out the area of a compound shape • use a formula to work out the area of a triangle • work out the area of a parallelogram • work out the area of a trapezium • calculate the surface area of a cuboid • convert between metric units for area and for volume • calculate the surface area of a prism • calculate the volume of a prism 	<ul style="list-style-type: none"> • use a probability scale to represent a chance • collect data and use it to find probabilities • decide if an event is fair or biased • recognise mixed events where you can distinguish different probabilities • use a sample space to calculate probabilities • use relative frequency to estimate probabilities • recognise mutually exclusive outcomes and exhaustive outcomes • use a Venn diagram to calculate probabilities
Unit 6 - Graphs	Unit 11 - Percentages	
<ul style="list-style-type: none"> • recognise patterns within coordinates • draw graphs of linear rules • know the gradient of a line from its linear equation • establish the equation of a line in the form $y = mx + c$ from its graph • draw graphs from real-life situations to show the relationship between two variables • recognise and draw the graph from a quadratic equation • solve a quadratic equation from a graph 	<ul style="list-style-type: none"> • use a multiplier to calculate a percentage of an amount • write one quantity as a percentage of another • use percentages to compare two quantities • use a multiplier to calculate a percentage increase or decrease • work out a change of value as a percentage increase or decrease • calculate an increase of more than 100% 	
Summative assessment:	Summative assessment:	Summative assessment:
3 x Unit Assessments	3 x Unit Assessments	2 x Unit Assessments

Programme of Learning – Overview

Key Stage 3		
Year title:	Y9 Scheme of Work	Year group: 9
Autumn Term 1 title:	Spring Term 1 title:	Summer Term 1 title:
Intent and composite knowledge:	Intent and composite knowledge:	Intent and composite knowledge:
Unit 1 – Percentages	Unit 5 – Algebra	Unit 9 – Right Angled Triangles
<ul style="list-style-type: none"> • know what is meant by simple interest • solve problems involving simple interest • use the multiplier method to calculate the result of a percentage increase or decrease • calculate the percentage change in a value • calculate the original value, given a percentage change • calculate the result of repeated percentage changes 	<ul style="list-style-type: none"> • expand brackets with numbers or variables outside of the bracket • factorise expressions (where the common factor is a number or a variable) • expand expressions with two brackets and simplify them • solve equations with one or more sets of brackets • solve equations with fractions • change the subject of a formula • expand brackets and simplify more complex expressions (involving more than one variable) • factorise more complex expressions (with more than one common factor) • expand double brackets • solve equations where the variable is in the denominator of a fraction • multiply out three brackets • factorise quadratic expressions • recognise and use the difference of two squares • solve simultaneous equations algebraically by elimination and substitution 	<ul style="list-style-type: none"> • understand what similar triangles are • use and recall facts about similar triangles • use Pythagoras' theorem to calculate the longest side in a right-angled triangle • use Pythagoras' theorem to calculate missing sides in right-angled triangles • use Pythagoras' theorem to solve problems in context • understand what the trigonometric ratios sine, cosine and tangent are • calculate an unknown length of a right-angled triangle, given one side and another angle • calculate an unknown angle of a right-angled triangle, given 2 sides • use the converse of Pythagoras' theorem to establish whether or not a triangle is a right-angled triangle
Unit 2 – Fractions	Unit 6 – Decimal Numbers	Unit 10 – Using Data
<ul style="list-style-type: none"> • add or subtract any two fractions • multiply two fractions • divide two fractions or a fraction and an integer. • add or subtract mixed numbers • multiply two fractions or mixed numbers • divide one fraction or mixed number by another fraction or mixed number • add, subtract, multiply or divide fractions containing a variable 	<ul style="list-style-type: none"> • round numbers to a given number of decimal places • round numbers to a given number of significant figures • divide with decimals • solve best value problems • multiply decimal numbers by 10^m (where m can be a positive or negative integer). • understand and work with standard form, using both positive and negative powers of ten. • multiply numbers in standard form • divide numbers in standard form • use limits of accuracy when rounding data 	<ul style="list-style-type: none"> • use and interpret a variety of graphs and diagrams • use and interpret a variety of time-series graphs • interpret a variety of two-way tables • compare two sets of data from statistical diagrams • draw a line of best fit to show a correlation • estimate a mean from grouped data • draw a cumulative frequency diagram • estimate the median and interquartile range and use them to compare distributions
Summative assessment:	Summative assessment:	Summative assessment:
2 x Unit Assessments	2 x Unit Assessments	2 x Unit Assessments

Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
Unit 3 – Polygons	Unit 7 – 3D Shapes	-Ensure pupils are ready for the start of the GCSE course
<ul style="list-style-type: none"> • know the names of polygons • know the difference between an irregular and a regular polygon • work out missing interior angles in irregular polygons • work out the sizes of the interior angles of regular polygons • work out the exterior angles of regular polygons • work out angles in polygons involving variables • establish which regular polygons tessellate 	<ul style="list-style-type: none"> • work out the surface areas of cubes or cuboids • use a simple formula work out the volume of a cube or cuboid • work out the volume of a triangular prism • convert the metric units for area, volume and capacity • calculate the surface area of a prism • calculate the volume of a cylinder • calculate the curved surface area of a cylinder • calculate the total surface area of a closed cylinder • calculate the volumes and surface areas of composite shapes 	-Look back over previous topics and filling in any gaps in understanding
Unit 4 –Solving Equations Graphically	Unit 8 – Compound Units	
<ul style="list-style-type: none"> • draw any linear graph from its equation • solve a linear equation from a graph • plot a graph from a real life situation • draw graphs from quadratic equations • solve quadratic equations graphically • solve problems that use quadratic graphs • solve a pair of simultaneous equations graphically • draw graphs of cubic equations • solve cubic equations graphically 	<ul style="list-style-type: none"> • solve distance/time/speed problems • read and interpret distance time graphs • solve problems involving density/mass/volume • solve problems involving pressure • apply the unit cost method to solve problems such as best value 	
Summative assessment:	Summative assessment:	Summative assessment:
2 x Unit Assessments	2 x Unit Assessments	

Programme of Learning – Overview

Key Stage 4			
Year title / big question:	Year 10 Higher Course	Year group:	10
Autumn Term 1 title:		Spring Term 1 title:	
Intent and composite knowledge (overview):		Intent and composite knowledge :	
Unit 1: Basic Number		Unit 8: Angle Facts	
Unit 12: Similarity			
<p>Solve problems set in a real-life context.</p> <p>Multiply a decimal number by another decimal number</p> <p>Divide by a decimal number.</p> <p>Round to a given number of significant figures.</p> <p>Estimate before calculating.</p> <p>Round a calculation to give a reasonable answer.</p> <p>Find multiples and factors.</p> <p>Identify prime numbers.</p> <p>Identify square and triangular numbers.</p> <p>Find square roots.</p> <p>Identify cubes and cube roots.</p> <p>Identify prime factors.</p> <p>Identify the least common multiple of two numbers.</p> <p>Identify the highest common factor of two multiples.</p> <p>Multiply and divide positive and negative numbers.</p>	<p>To know the sum of the angles on a straight line, around a point, in a triangle and in a quadrilateral.</p> <p>To solve missing angle problems in triangles.</p> <p>To work out the sum of the interior angles in a polygon.</p> <p>To be able to calculate the size of the interior and exterior angles of any regular polygon.</p> <p>To solve problems involving alternate, corresponding, allied and opposite angles.</p> <p>To be able to calculate the size of angles in special quadrilaterals using their geometric properties.</p> <p>To be able to make a scale drawing to a given scale.</p> <p>To be able to convert measurements to calculate actual distances.</p> <p>To be able to read, interpret and draw bearings diagrams.</p> <p>To use the geometrical properties of a diagram to calculate a bearing.</p>	<p>Show two triangles are similar.</p> <p>Work out the scale factor between similar triangles.</p> <p>Solve problems involving the area and volume of similar shapes.</p>	
Unit 2: Fractions, Decimals & Percentages		Unit 9: Length, Area & Volume	
Unit 13: Exploring & Applying Probability			
<p>Find one quantity as a fraction of another.</p> <p>Add and subtract fractions with different denominators.</p> <p>Multiply proper fractions and mixed numbers.</p> <p>Divide by fractions.</p> <p>Use a calculator to accurately solve problems involving fractions.</p> <p>Increase and decrease quantities by a percentage.</p> <p>Work out percentage change</p> <p>Express one quantity as a percentage of another.</p>	<p>Calculate the circumference and area of a circle.</p> <p>Calculate the area of a parallelogram.</p> <p>Calculate the area of a trapezium.</p> <p>Calculate the length of an arc.</p> <p>Calculate the area and angle of a sector.</p> <p>Calculate the volume of a prism.</p> <p>Calculate the volume and surface area of a cylinder.</p> <p>Calculate the volume of a pyramid.</p> <p>Calculate the volume and surface area of a cone.</p> <p>Calculate the volume and surface area of a sphere.</p>	<p>Calculate experimental probabilities and relative frequencies.</p> <p>Estimate probabilities from experiments.</p> <p>Use different methods to estimate probabilities.</p> <p>Recognise mutually exclusive, complementary and exhaustive events.</p> <p>Predict the likely number of successful events, given the number of trials and the probability of any one outcome.</p> <p>Read two-way tables and use them to work out probabilities.</p> <p>Use Venn diagrams to solve probability questions.</p>	

<p>Unit 3: Statistical Diagrams & Averages</p> <p>Draw and interpret bar charts and pie charts. Draw and interpret line graphs.</p> <p>Use averages to solve more complex problems.</p> <p>Identify the advantages and disadvantages of each type of average and learn which one to use in different situations.</p> <p>Work out and use the range of a set of data.</p> <p>Calculate the mode, the median and the mean from a frequency table</p> <p>Identify the modal group.</p> <p>Estimate the mean from a grouped frequency table.</p> <p>Draw, interpret and use scatter diagrams. Draw and use a line of best fit.</p>	<p>WORK EXPERIENCE</p>	<p>Unit 14: Powers & Standard Form</p> <p>Use powers (also known as indices). Multiply and divide by powers of 10.</p> <p>Use rules for multiplying and dividing powers.</p> <p>Change a number into standard form. Calculate using numbers in standard form.</p>
<p>Unit 4: Ratio & Proportion</p> <p>Simplify a ratio. Express a ratio as a fraction. Divide amounts in given ratios. Complete calculations from a given ratio.</p> <p>Recognise and solve problems using direct proportion.</p> <p>Find either the cost per unit weight or the weigh per unit cost and use to identify the cheapest product.</p> <p>Recognise and solve problems involving the compound measures of rates of pay, speed, density and pressure.</p> <p>Calculate compound interest Solve problems involving repeated percentage change. Calculate the original amount after a known percentage change.</p>		<p>Unit 15: Linear Equations</p> <p>Solve equations in which the variable (the letter) appears as part of the numerator of a fraction.</p> <p>Solve equations where the variable appears on both sides of the equals sign.</p> <p>Set up equations from given information and then solve them.</p> <p>Solve simultaneous linear equations in two variables using the elimination method.</p> <p>Solve simultaneous linear equations in two variables using the substitution method.</p> <p>Solve simultaneous linear equations by balancing coefficients.</p>
<p>Summative assessment: 4 x Unit Assessments</p>	<p>Summative assessment: 2 x Unit Assessments</p>	<p>Summative assessment: 3 x Unit Assessments</p>

Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:																					
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):																					
Unit 5: Variation	Unit 10: Linear Graphs	Unit 15: Linear Equations (continued)																					
<table border="1"> <tr> <td data-bbox="107 288 689 352">Solve problems where two variables have a directly proportional relationship.</td> </tr> <tr> <td data-bbox="107 352 689 400">Work out the constant of proportionality.</td> </tr> <tr> <td data-bbox="107 400 689 464">Solve problems where two variables have an inversely proportional relationship.</td> </tr> <tr> <td data-bbox="107 464 689 512">Work out the constant of proportionality.</td> </tr> </table>	Solve problems where two variables have a directly proportional relationship.	Work out the constant of proportionality.	Solve problems where two variables have an inversely proportional relationship.	Work out the constant of proportionality.	<table border="1"> <tr> <td data-bbox="801 288 1435 352">Draw linear graphs by finding points.</td> </tr> <tr> <td data-bbox="801 352 1435 400">Find the gradient of a straight line.</td> </tr> <tr> <td data-bbox="801 400 1435 464">Draw a line with a certain gradient.</td> </tr> <tr> <td data-bbox="801 464 1435 512">Draw graphs using the gradient-intercept method.</td> </tr> <tr> <td data-bbox="801 512 1435 560">Draw graphs using the cover-up method.</td> </tr> <tr> <td data-bbox="801 560 1435 608">Find the equation of a line, using its gradient and intercept.</td> </tr> <tr> <td data-bbox="801 608 1435 655">Find the equation of a line given two points on the line.</td> </tr> <tr> <td data-bbox="801 655 1435 719">Convert from one unit to another unit by using a conversion graph.</td> </tr> <tr> <td data-bbox="801 719 1435 767">Use straight-line graphs to find formulae.</td> </tr> <tr> <td data-bbox="801 767 1435 815">Solve simultaneous linear equations using graphs.</td> </tr> <tr> <td data-bbox="801 815 1435 991">Draw linear graphs parallel or perpendicular to other lines and passing through a specific point.</td> </tr> </table>	Draw linear graphs by finding points.	Find the gradient of a straight line.	Draw a line with a certain gradient.	Draw graphs using the gradient-intercept method.	Draw graphs using the cover-up method.	Find the equation of a line, using its gradient and intercept.	Find the equation of a line given two points on the line.	Convert from one unit to another unit by using a conversion graph.	Use straight-line graphs to find formulae.	Solve simultaneous linear equations using graphs.	Draw linear graphs parallel or perpendicular to other lines and passing through a specific point.	<table border="1"> <tr> <td data-bbox="1525 288 2152 368">Solve problems using simultaneous linear equations.</td> </tr> <tr> <td data-bbox="1525 368 2152 464">Solve a simple linear inequality and represent it on a number line.</td> </tr> <tr> <td data-bbox="1525 464 2152 512">Show a graphical inequality.</td> </tr> <tr> <td data-bbox="1525 512 2152 608">Find regions that satisfy more than one graphical inequality.</td> </tr> <tr> <td data-bbox="1525 608 2152 655">Prove given results using algebraic methods.</td> </tr> <tr> <td data-bbox="1525 655 2152 719">Compare coefficients in order to satisfy identities.</td> </tr> </table>	Solve problems using simultaneous linear equations.	Solve a simple linear inequality and represent it on a number line.	Show a graphical inequality.	Find regions that satisfy more than one graphical inequality.	Prove given results using algebraic methods.	Compare coefficients in order to satisfy identities.
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Unit 6: Transformations, Constructions & Loci		Unit 16: Number & Sequences																					
<table border="1"> <tr> <td data-bbox="107 788 689 812">Demonstrate that two triangles are congruent.</td> </tr> <tr> <td data-bbox="107 812 689 836">Find the order of rotational symmetry for a 2D shape.</td> </tr> <tr> <td data-bbox="107 836 689 916">Recognise shapes with rotational symmetry.</td> </tr> <tr> <td data-bbox="107 916 689 940">Translate, reflect, rotate and enlarge a 2D shape.</td> </tr> <tr> <td data-bbox="107 940 689 963">Combine transformations.</td> </tr> <tr> <td data-bbox="107 963 689 1019">Construct the bisectors of lines and angles.</td> </tr> <tr> <td data-bbox="107 1019 689 1043">Construct angles of 60° and 90°.</td> </tr> <tr> <td data-bbox="107 1043 689 1067">Draw a locus for a given rule.</td> </tr> <tr> <td data-bbox="107 1067 689 1091">Solve practical problems using loci.</td> </tr> <tr> <td data-bbox="107 1091 689 1115">Construct and interpret plans and elevations of 3D shapes.</td> </tr> <tr> <td data-bbox="107 1115 689 1203">Recognise that vectors have a magnitude and direction and be able to add/subtract vectors and multiply by a scalar</td> </tr> </table>	Demonstrate that two triangles are congruent.	Find the order of rotational symmetry for a 2D shape.	Recognise shapes with rotational symmetry.	Translate, reflect, rotate and enlarge a 2D shape.	Combine transformations.	Construct the bisectors of lines and angles.	Construct angles of 60° and 90°.	Draw a locus for a given rule.	Solve practical problems using loci.	Construct and interpret plans and elevations of 3D shapes.	Recognise that vectors have a magnitude and direction and be able to add/subtract vectors and multiply by a scalar		<table border="1"> <tr> <td data-bbox="1525 788 2152 844">Recognise patterns in number sequences.</td> </tr> <tr> <td data-bbox="1525 844 2152 900">Generate sequences, given the nth term.</td> </tr> <tr> <td data-bbox="1525 900 2152 956">Find the nth term of a linear sequence.</td> </tr> <tr> <td data-bbox="1525 956 2152 1075">Recognise and continue some special number sequences such as square numbers.</td> </tr> <tr> <td data-bbox="1525 1075 2152 1179">Find the nth term of a sequence from a diagram or practical problem.</td> </tr> <tr> <td data-bbox="1525 1179 2152 1283">Generate the terms of a quadratic sequence from the nth term.</td> </tr> <tr> <td data-bbox="1525 1283 2152 1386">Work out the nth term of a quadratic sequence.</td> </tr> </table>	Recognise patterns in number sequences.	Generate sequences, given the n th term.	Find the n th term of a linear sequence.	Recognise and continue some special number sequences such as square numbers.	Find the n th term of a sequence from a diagram or practical problem.	Generate the terms of a quadratic sequence from the n th term.	Work out the n th term of a quadratic sequence.			
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Work out the n th term of a quadratic sequence.																							

Unit 7: Algebraic Manipulation	Unit 11: Right Angled Triangles	
<p>Recognise expressions, equations, formulae and identities.</p> <p>Substitute into, manipulate and simplify algebraic expressions.</p> <p>Factorise an algebraic expression.</p> <p>Expand two binomials to obtain a quadratic expression.</p> <p>Expand the square of a binomial.</p> <p>Expand more than two binomials.</p> <p>Factorise a quadratic expression of the form $x^2 + ax + b$ into two linear brackets.</p> <p>Factorise a quadratic expression of the form $ax^2 + bx + c$ into two linear brackets.</p> <p>Change the subject of a formula.</p>	<p>Calculate the hypotenuse in a right angle triangle.</p> <p>Calculate the length of a shorter side in a right angled triangle.</p> <p>Solve practical problems involving Pythagoras' theorem.</p> <p>Use Pythagoras' theorem and isosceles triangles.</p> <p>Use Pythagoras' theorem to solve problems involving three dimensions.</p> <p>Use the three trigonometric ratios.</p> <p>Use the trigonometric ratios to calculate an angle.</p> <p>Find lengths of sides and angles in right-angled triangles using the sine and cosine functions.</p> <p>Find sides and angles in right-angled triangles using the tangent function.</p> <p>Decide which trigonometric ratio to use in a right-angled triangle.</p> <p>Solve practical problems using trigonometry. Solve problems using an angle of elevation or an angle of depression.</p> <p>Solve bearing problems using trigonometry.</p> <p>Find the length x in this isosceles triangle. Calculate the area of the triangle.</p>	
Summative assessment:	Summative assessment:	Summative assessment:
3 x Unit Assessments	2 x Unit Assessments	2 x Unit Assessments PPE's

Programme of Learning – Overview

Key Stage 4			
Year title / big question:	Year 10 Foundation Course		Year group: 10
Autumn Term 1 title:	Spring Term 1 title:	Summer Term 1 title:	
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	
Unit 1: Basic Number	Unit 7: Decimals & Fractions	Unit 11: Perimeter & Area	
<ul style="list-style-type: none"> use a number line to represent negative numbers use inequalities with negative numbers compare and order positive and negative numbers. use the four rules of arithmetic with integers and decimals. work out the answers to problems with more than one mathematical operation. 	<ul style="list-style-type: none"> multiply and divide with decimals. recognise different types of fraction, reciprocal, terminating decimal and recurring decimal convert terminating decimals to fractions convert fractions to decimals find reciprocals of numbers or fractions. work out a fraction of a quantity find one quantity as a fraction of another. add and subtract fractions with different denominators. multiply proper fractions multiply mixed numbers divide by fractions. use a calculator to add and subtract fractions use a calculator to multiply and divide fractions. 	<ul style="list-style-type: none"> calculate the perimeter and area of a rectangle. calculate the perimeter and area of a compound shape made from rectangles. calculate the area of a triangle use the formula for the area of a triangle. calculate the area of a parallelogram use the formula for the area of a parallelogram. calculate the area of a trapezium use the formula for the area of a trapezium. recognise terms used for circle work calculate the circumference of a circle. calculate the area of a circle give answers for circle calculations in terms of δ. 	
Unit 2: Measures & Scale Drawings		Unit 12: Transformations	
<ul style="list-style-type: none"> convert from one metric unit to another convert from one imperial unit to another. use approximate conversion factors to change between imperial units and metric units. read and draw scale drawings use a scale drawing to make estimates. draw nets of some 3D shapes identify a 3D shape from its net. read from and draw on isometric grids interpret diagrams to draw plans and elevations. 		<ul style="list-style-type: none"> work out the order of rotational symmetry for a 2D shape recognise shapes with rotational symmetry. translate a 2D shape reflect a 2D shape in a mirror line. rotate a 2D shape about a point enlarge a 2D shape by a scale factor use more than one transformation. represent vectors add and subtract vectors. 	

Unit 3: Charts, Tables & Averages	Unit 8: Linear Graphs	Unit 13: Probability & Events
<ul style="list-style-type: none"> • use tally charts and frequency tables to collect and represent data • use grouped frequency tables to collect and represent data. • draw pictograms to represent statistical data • draw bar charts and vertical line charts to represent statistical data. • draw a line graph to show trends in data. • work out the mode, median, mean and range of small sets of data • decide which is the best average to use to represent a data set. 	<ul style="list-style-type: none"> • use flow diagrams to draw graphs • work out the equations of horizontal and vertical lines. • draw linear graphs without using flow diagrams. • work out the gradient of a straight line • draw a line with a certain gradient. • draw graphs using the gradient-intercept method • draw graphs using the cover-up method. • work out the equation of a line, using its gradient and y-intercept • work out the equation of a line given two points on the line. • work out the equation of a linear graph that is parallel to another line and passes through a specific point. • convert from one unit to another unit by using a conversion graph • use straight-line graphs to work out formulae. • solve simultaneous linear equations using graphs. 	<ul style="list-style-type: none"> • use the probability scale and the language of probability • calculate the probability of an outcome of an event. • calculate the probability of an outcome not happening when you know the probability of that outcome happening. • recognise mutually exclusive and exhaustive outcomes. • calculate experimental probabilities and relative frequencies from experiments • recognise different methods for estimating probabilities. • predict the likely number of successful outcomes, given the number of trials and the probability of any one outcome. • apply systematic listing and counting strategies to identify all outcomes for a variety of problems.
<p>WORK EXPERIENCE</p>		
<p>Summative assessment:</p>	<p>Summative assessment:</p>	<p>Summative assessment:</p>
<p>3 x Unit Assessments</p>	<p>2 x Unit Assessments</p>	<p>3 x Unit Assessments</p>

Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
Unit 4: Angle Facts <ul style="list-style-type: none"> calculate angles on a straight line calculate angles around a point use vertically opposite angles. recognise and calculate the angles in different sorts of triangle. calculate the sum of the interior angles in a polygon. calculate the exterior angles and the interior angles of a regular polygon. calculate angles in parallel lines. use angle properties in quadrilaterals. use a bearing to specify a direction. 	Unit 9: Expressions & Formulae <ul style="list-style-type: none"> write an algebraic expression recognise expressions, equations, formulae and identities. substitute into, simplify and use algebraic expressions. expand brackets such as $2(x - 3)$ expand and simplify brackets. factorise an algebraic expression. expand two linear brackets to obtain a quadratic expression. factorise a quadratic expression of the form $x^2 + ax + b$ into two linear brackets. change the subject of a formula. 	Unit 14: Volumes & Surface Area <ul style="list-style-type: none"> use the correct terms when working with 3D shapes. calculate the surface area and volume of a cuboid. calculate the volume and surface area of a prism. calculate the volume and surface area of a cylinder.
Unit 5: Number Properties <ul style="list-style-type: none"> find multiples of whole numbers. recognise multiples of numbers. identify the factors of a number. identify prime numbers. identify prime factors identify the lowest common multiple (LCM) of two numbers identify the highest common factor (HCF) of two numbers. identify square numbers use a calculator to find the square of a number. recognise the square roots of square numbers up to 225 use a calculator to find the square roots of any number. use some of the important keys when working on a calculator. 	Unit 10: Ratio, Speed & Proportion <ul style="list-style-type: none"> simplify a ratio express a ratio as a fraction divide amounts into given ratios complete calculations from a given ratio and partial information. recognise the relationship between speed, distance and time calculate average speed from distance and time calculate distance travelled from the speed and the time taken calculate the time taken on a journey from the speed and the distance. recognise and solve problems that involve direct proportion. find the cost per unit mass find the mass per unit cost use the above to find which product is better value. 	Unit 15: Linear Equations <ul style="list-style-type: none"> solve linear equations such as $3x - 1 = 11$ where the variable only appears on one side use inverse operations and inverse flow diagrams solve equations by balancing solve equations in which the variable (the letter) appears in the numerator of a fraction solve equations where you have to first expand brackets. solve equations where the variable appears on both sides of the equals sign.

<p>Unit 6: Approximations</p> <ul style="list-style-type: none"> • round a whole number. • round decimal numbers to a given accuracy. • identify significant figures • round numbers to a given number of significant figures • use approximation to estimate answers and check calculations • round a calculation at the end of a problem, to give what is considered to be a sensible answer. 		
<p>Summative assessment:</p>	<p>Summative assessment:</p>	<p>Summative assessment:</p>
<p>3 x Unit Assessments</p>	<p>2 x Unit Assessments</p>	<p>2 x Unit Assessments PPE's</p>

Programme of Learning – Overview

Key Stage 4				
Year title / big question:	Year 11 Foundation Course		Year group:	11
Autumn Term 1 title:	Spring Term 1 title:		Summer Term 1 title:	
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):		Intent and composite knowledge (overview):	
Unit 16: Percentages & Compound Measures	PPE's		Unit 26: Powers & Standard Form	
<ul style="list-style-type: none"> convert percentages to fractions and decimals and vice versa. calculate a percentage of a quantity increase and decrease quantities by a percentage. express one quantity as a percentage of another work out percentage change. recognise and solve problems involving the compound measures of rates of pay, density and pressure 			<ul style="list-style-type: none"> write a number as a power of another number use powers (also known as indices) multiply and divide by powers of 10. use rules for multiplying and dividing powers multiply and divide numbers by powers of 10. 	
Unit 17 : Percentages and Variation			Unit 27: Non-Linear Graphs	
<ul style="list-style-type: none"> calculate simple interest calculate compound interest solve problems involving repeated percentage change calculate the original amount, given the final amount, after a known percentage increase or decrease solve problems in which two variables have a directly proportional relationship (direct variation) work out the constant of proportionality recognise graphs that show direct variation solve problems in which two variables have an inversely proportional relationship (inverse variation) work out the constant of proportionality 			<ul style="list-style-type: none"> interpret distance–time graphs draw a graph of the depth of liquid as a container is filled. draw and read values from quadratic graphs. solve a quadratic equation by factorisation. identify the significant points of a quadratic function graphically identify the roots of a quadratic function by solving a quadratic equation identify the turning point of a quadratic function. recognise and plot cubic and reciprocal graphs. 	

Unit 18 Representation & Interpretation	Unit 22: Simultaneous Equations & Linear Inequalities	GCSE Examination Preparation
<ul style="list-style-type: none"> • obtain a random sample from a population • collect unbiased and reliable data for a sample • draw and interpret pie charts • draw, interpret and use scatter diagrams • draw and use a line of best fit • identify the modal group • calculate an estimate of the mean from a grouped table 	<ul style="list-style-type: none"> • solve simultaneous linear equations in two variables using the elimination method. • solve simultaneous linear equations in two variables using the substitution method. • solve simultaneous linear equations by balancing coefficients. • solve problems using simultaneous linear equations. • solve a simple linear inequality and represent it on a number line. 	
Summative assessment:	Summative assessment:	Summative assessment:
3 x Unit Assessments	PPE's 1 x Unit Assessments	2 x Unit Assessments
Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
Unit 19: Constructions & Loci	Unit 23: Number and Sequences	
<ul style="list-style-type: none"> • construct accurate drawings of triangles, using a pair of compasses, a protractor and a straight edge • construct bisectors of lines and angles • construct angles of 60° and 90° • draw a locus for a given rule • solve practical problems using loci 	<ul style="list-style-type: none"> • recognise patterns in number sequences • recognise how number sequences are built up • generate sequences, given the nth term. • find the nth term of a linear sequence. • recognise and continue some special number sequences • understand how prime, odd and even numbers interact in addition, subtraction and multiplication problems. • find the nth term from practical problems involving sequences. 	

<p>Unit 20: Curved Shapes & Pyramids</p> <ul style="list-style-type: none"> • calculate the length of an arc • calculate the area and angle of a sector. • calculate the volume and surface area of a pyramid • calculate the volume and surface area of a cone • calculate the volume and surface area of a sphere 	<p>Unit 24: Congruency & Similarity</p> <ul style="list-style-type: none"> • demonstrate that two triangles are congruent. • recognise similarity in any two shapes • show that two shapes are similar • work out the scale factor between similar shapes. 	
<p>Unit 21: Right Angled Triangles</p> <ul style="list-style-type: none"> • Know what Pythagoras' theorem is • calculate the length of the hypotenuse in a right-angled triangle. • calculate the length of a shorter side in a right-angled triangle. • solve problems using Pythagoras' theorem. • use Pythagoras' theorem in isosceles triangles. • define, understand and use the three trigonometric ratios • use trigonometric ratios to calculate a length in a right-angled triangle. • use the trigonometric ratios to calculate an angle. • work out and remember trigonometric values for angles of 30°, 45°, 60° and 90°. • solve practical problems using trigonometry • solve problems using an angle of elevation or an angle of depression. • solve bearing problems using trigonometry. • use trigonometry to solve problems involving isosceles triangles. 	<p>Unit 25: Combined Events</p> <ul style="list-style-type: none"> • work out the probabilities when two or more events occur at the same time. • read two-way tables and use them to work out probabilities. • use Venn diagrams to solve probability questions. • understand frequency tree diagrams and probability tree diagrams • use probability tree diagrams to work out the probabilities involved in combined events. 	
<p>Summative assessment:</p>	<p>Summative assessment:</p>	<p>Summative assessment:</p>
<p>3 x Unit Assessments</p>	<p>3 x Unit Assessments</p>	<p>2 x Unit Assessments</p>

Programme of Learning – Overview

Key Stage 4					
Year title / big question:	Year 11 Higher Course		Year group:	11	
Autumn Term 1 title:		Spring Term 1 title:		Summer Term 1 title:	
Intent and composite knowledge (overview):		Intent and composite knowledge (overview):		Intent and composite knowledge (overview):	
Unit 17: Counting, Accuracy, Powers & Surds		PPE's		Unit 25: Algebraic Fractions & Functions	
Recognise rational numbers, reciprocals, terminating decimals and recurring decimals. Convert terminal decimals to fractions. Convert fractions to recurring decimals. Find reciprocals of numbers or fractions.				Simplify algebraic fractions Solve equations containing algebraic fractions.	
How to estimate powers and roots of any given positive number.				Change the subject of a formula where the subject occurs more than once.	
Apply the rules of powers to negative and fractional powers. Find and use the relationship between negative powers and roots.				Find the output of a function. Find the inverse function.	
Simplify surds. Calculate and manipulate surds, including rationalising a denominator.				Find the composite of two functions.	
Find the error interval or limits of accuracy of numbers that have been rounded to different degrees of accuracy.				Find an approximate solution for an equation using the process of iteration.	
Combine limits of two or more variables together to solve problems.					
Work out the number of choices, arrangements or outcomes when choosing from lists or sets.					

Unit 18: Quadratic Equations		GCSE Examination Preparation												
<table border="1"> <tr><td>Draw and read values from quadratic graphs.</td></tr> <tr><td>Solve a quadratic equation by factorisation. Rearrange a quadratic equation so that it can be factorised.</td></tr> <tr><td>Solve a quadratic equation by using the quadratic formula. Recognise why some quadratic equations cannot be solved.</td></tr> <tr><td>Solve a quadratic equation by completing the square.</td></tr> <tr><td>Identify the significant points of a quadratic function graphically. Identify the roots of a quadratic function by solving a quadratic equation. Identify the turning point of a quadratic function by using symmetry or completing the square.</td></tr> <tr><td>Solve a pair of simultaneous equations where one is linear and one is non-linear, using graphs.</td></tr> <tr><td>Solve equations by the method of intersecting graphs.</td></tr> <tr><td>Solve simultaneous equations where one equation is linear and the other is non-linear.</td></tr> <tr><td>Solve quadratic inequalities.</td></tr> </table>	Draw and read values from quadratic graphs.	Solve a quadratic equation by factorisation. Rearrange a quadratic equation so that it can be factorised.	Solve a quadratic equation by using the quadratic formula. Recognise why some quadratic equations cannot be solved.	Solve a quadratic equation by completing the square.	Identify the significant points of a quadratic function graphically. Identify the roots of a quadratic function by solving a quadratic equation. Identify the turning point of a quadratic function by using symmetry or completing the square.	Solve a pair of simultaneous equations where one is linear and one is non-linear, using graphs.	Solve equations by the method of intersecting graphs.	Solve simultaneous equations where one equation is linear and the other is non-linear.	Solve quadratic inequalities.					
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Solve equations by the method of intersecting graphs.														
Solve simultaneous equations where one equation is linear and the other is non-linear.														
Solve quadratic inequalities.														
Unit 19: Sampling & More Complex Diagrams	Unit 22: Properties of Circles													
<table border="1"> <tr><td>Understand sampling.</td></tr> <tr><td>Collect unbiased reliable data for a sample.</td></tr> <tr><td>Draw and interpret frequency polygons.</td></tr> <tr><td>Draw and interpret cumulative frequency graphs.</td></tr> <tr><td>Draw and interpret box plots.</td></tr> <tr><td>Draw and interpret histograms where the bars are of equal width.</td></tr> <tr><td>Draw and interpret histograms where the bars are of unequal width.</td></tr> <tr><td>Calculate the median, quartiles and interquartile range from a histogram.</td></tr> </table>	Understand sampling.	Collect unbiased reliable data for a sample.	Draw and interpret frequency polygons.	Draw and interpret cumulative frequency graphs.	Draw and interpret box plots.	Draw and interpret histograms where the bars are of equal width.	Draw and interpret histograms where the bars are of unequal width.	Calculate the median, quartiles and interquartile range from a histogram.	<table border="1"> <tr><td>Work out the size of angles in circles.</td></tr> <tr><td>Find the size of angles in cyclic quadrilaterals.</td></tr> <tr><td>Use tangents and chords to find the size of angles in circles.</td></tr> <tr><td>Use the alternate segment theorem to find the size of angles in circles.</td></tr> </table>	Work out the size of angles in circles.	Find the size of angles in cyclic quadrilaterals.	Use tangents and chords to find the size of angles in circles.	Use the alternate segment theorem to find the size of angles in circles.	
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Summative assessment:	Summative assessment:	Summative assessment:												
3 x Unit Assessments	2 x Unit Assessments	3 x Unit Assessments												

Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge (overview):	Intent and composite knowledge:	Intent and composite knowledge (overview):
Unit 20: Combined Events	Unit 23: Triangles	
<p>Work out the probability of different outcomes of combined events.</p> <p>Work out the probability of two outcomes or events occurring at the same time.</p> <p>Use tree diagrams to work out the probability of combined events.</p> <p>Use the connectors 'and' and 'or' to work out the probabilities for combined events.</p> <p>Work out the probability of combined events when the probabilities change after each event.</p>	<p>Use trigonometric ratios and Pythagoras' theorem to solve more complex two-dimensional problems.</p> <p>Use trigonometric ratios and Pythagoras' theorem to solve more complex three-dimensional problems.</p> <p>Find the sine, cosine and tangent of any angle from 0° to 360°</p> <p>Use the sine rule and the cosine rule to find sides and angles in any triangle.</p> <p>Work out the area of a triangle if you know two sides and the included angle.</p>	
Unit 21: Vectors	Unit 24: Graphs	
<p>Add and subtract vectors.</p> <p>Use vectors to solve geometric problems.</p>	<p>Interpret distance-time graphs.</p> <p>Draw a graph of the depth of liquid as a container is filled.</p> <p>Read information from a velocity-time graph</p> <p>Work out the distance travelled from a velocity-time graph</p> <p>Work out the acceleration from a velocity-time graph.</p> <p>Use areas of rectangles, triangles and trapeziums to estimate the area under a curve.</p> <p>Interpret the meaning of the area under a curve.</p> <p>Draw a tangent at a point on a curve and use it to work out the gradient at a point on a curve.</p> <p>Interpret the gradient at a point on a curve.</p> <p>Find the equation of a tangent to a circle.</p> <p>Recognise and plot cubic, exponential and reciprocal graphs.</p> <p>Transform a graph.</p>	
Summative assessment:	Summative assessment:	Summative assessment:
3 x Unit Assessments	2 x Unit Assessments	2 x Unit Assessments

Programme of Learning – Overview

Key Stage 5			
Year title / big question:	Y12 P&M Scheme	Year group:	12
Autumn Term 1 title:	Spring Term 1 title:	Summer Term 1 title:	
Intent and composite knowledge (overview):	Intent and composite knowledge:	Intent and composite knowledge (overview):	
<p>Solving Quadratic Equations: by factorising, by formula with simple sketches of</p> <p>Solving Quadratics equations: by completing the square, leading to sketching curves</p> <hr/> <p>Solving quadratic equations: introduce discriminant (more later after inequalities), equations that can be transformed into a quadratic using a substitution, problem</p> <p>Solving simultaneous equations: linear, graphical interpretation, intersection of two lines, leading onto one linear, one quadratic</p> <p>Inequalities: linear and quadratic</p> <p>Inequalities: discriminant problems</p> <p>Sketching: cubics, quartics, reciprocals</p> <p>Transformations of functions</p> <hr/> <p>Exponential functions - properties and graph of $y = a^x$ <i>Begin with a brief overview of functions and inverse functions - domain and range</i></p> <p>Logarithms - introduce and use $\log_a n = x$ and $a^x = n$. Introduce log laws</p> <p>Logarithms - solve equations in the form $a^x = b$</p>	<p>Vectors: introduction, column vectors, i and j form, magnitude of a vector, adding vectors, unit vectors, multiplying by scalars</p> <p>Vectors: working with vectors, position vectors, use vectors to solve geometric</p> <p>Vectors: modelling with vectors, use vectors in speed and distance calculations</p> <p>Vectors: consolidate</p> <p>Forces: types of force, drawing force diagrams, Newton's first law, forces as vectors in i and j form, mass and weight</p> <p>Newton's second law - basic concepts, introducing resultant force = ma.</p> <hr/> <p>Newton's second law - problem solving, including in terms of i and j</p> <p>Newton's third law - introduction, connected particles car and trailer</p> <p>Using Newton's second law - connected particles lifts</p> <p>Newton's third law - connected particles pulleys</p> <hr/> <p>Newton's third law - smooth pulleys</p>	<p>recap lesson</p> <hr/> <p>e sketch, solve, differentiation, modelling</p> <hr/> <p>e sketch, solve, differentiation, modelling</p> <hr/> <p>e sketch, solve, differentiation, modelling</p> <hr/> <p>In sketch, solve, modelling</p> <hr/> <p>modelling with logs</p> <hr/> <p>Introduce radians, conversions, exact values and graphs</p> <hr/> <p>Radian measures - arcs and sectors</p> <hr/> <p>Solving trig equations in radians (including use of tan and Pythagorean identities)</p> <hr/> <p>Solving trig equations in radians (including use of tan and Pythagorean identities)</p> <hr/> <p>Small angle approximations</p>	
Summative assessment:	Summative assessment:	Summative assessment:	
<p>Quadratics, simultaneous equations, inequalities, graphs and transformations</p>			

Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
<p>Co-ordinate Geometry - straight lines: gradients, equation of a straight line, parallel and perpendicular lines, midpoints, lengths of line segments</p> <p>Co-ordinate Geometry - straight lines: intersection of two lines</p> <p>Co-ordinate Geometry - straight lines: parallel and perpendicular lines, length and</p> <p>Co-ordinate Geometry - straight lines: problem solving</p> <p>Co-ordinate Geometry - circles: equation of a circle</p> <p>Co-ordinate Geometry - circles: intersections of straight lines and circles</p> <p>Co-ordinate Geometry - circles: problems involving tangents and chords</p> <p>Co-ordinate Geometry - circles: problems involving circles and triangles</p> <p>Distance time graphs and velocity time graphs</p> <p>Distance time graphs and velocity time graphs</p> <p>SUVAT: understand and derive SUVAT equations</p> <p>SUVAT: problem solving</p> <p>SUVAT: motion under gravity</p>	<p>Integration - understand as the reverse of differentiation, understand the need for +c, integrate polynomials</p> <p>Integration - simple expressions, given $f'(x)$ and a point on the curve, find an equation of the form $f(x)$</p> <p>Integration - evaluate a definite integral</p> <p>Integration - finding area bounded by a curve and the x-axis</p> <p>Integration - area bounded by curves and straight lines</p> <p>Kinematics variable acceleration (rates of change) - introduce displacement, velocity and acceleration as functions of time, use differentiation to model motion for a particle moving with variable acceleration</p> <p>Kinematics variable acceleration - understand gradients of graphs link to rates of change; find max and min velocities and understand how this links with $a=0$</p> <p>Vectors, forces and integration</p> <p>Kinematics variable force (integration) - introduce integration to model motion of a particle moving under a variable force</p> <p>Kinematics variable force (integration) - understand area under the graph leads to an integral, use initial conditions - use calculus to derive the constant accelerations</p>	<p>Revision of Y12 content</p> <p>Exam Practice – using AS Level Papers</p> <p>PPE's</p> <p>Work Experience</p>
Summative assessment:	Summative assessment:	Summative assessment:
PPE's	Vectors, forces and integration	PPE's

Programme of Learning – Overview

Key Stage 5

Year title / big question: Y12 P&S Scheme		Year group: 12
Autumn Term 1 title:	Spring Term 1 title:	Summer Term 1 title:
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
<p>Indices 1: laws of indices, evaluate expressions including negative, fractional and zero indices</p> <p>Surds 1: manipulate surds, multiply and divide</p> <p>Surds 2: Rationalise the denominators, difference of two squares for rationalising</p> <p>Algebraic division by factoring and cancelling in algebraic fractions and dividing a Factor theorem application and use to fully factorise a cubic expression</p> <p>Proof by deduction, exhaustion and disproof by a counter-example, following logical steps</p> <p>Proof by deduction, exhaustion and disproof by a counter-example, following logical steps</p> <p>Binomial expansion 1 using Pascal's triangle and factorial notation</p> <p>Binomial expansion 2 using formula including finding individual coefficients</p> <p>Binomial expansion 2 using formula including finding individual coefficients and estimates</p>	<p>Graphs and Transformations <i>*Sine and Cosine Rule</i></p> <p>Graphs and Transformations</p> <p>Solving equations</p> <p>Solving equations</p> <p>Solving equations using the tan identity</p> <p>Solving equations using the Pythagorean identities</p> <p>Solving equations using the Pythagorean identities</p> <p>Consolidation</p>	<p>Intro to hypothesis testing using the Binomial distribution- null hypothesis, alternative hypothesis, significance level, p-value</p> <p>Hypothesis testing using probability of test statistic (p value) and comparing it to significance level, understanding critical regions and acceptance regions</p> <p>Hypothesis testing - one and two tail tests</p> <p>Hypothesis testing - one and two tail tests</p> <p>Hypothesis testing - one and two tail tests</p> <p>. Algebraic Fractions</p> <p>. Introduction - two and three linear terms</p> <p>. Repeated linear term</p> <p>. Improper algebraic fractions</p>
Summative assessment:	Summative assessment:	Summative assessment:
Indices, surds, factor theorem and proof		

Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
<p>Probability - mutually exclusive events, independent events, set notation, tree diagrams and venn diagrams("and" "or" rules)</p> <p>Probability - mutually exclusive events, independent events, set notation, tree diagrams and venn diagrams("and" "or" rules)</p> <p>Discrete probability distributions (note calculating the expected value and variance are not included at AS)</p> <p>Discrete distributions - consolidation</p> <p>Binomial distribution - basic concepts, manual calculations, how to use calculator, link to Binomial expansion</p> <p>Binomial distribution - further calcs, use of tables</p> <p>Binomial distribution - further calcs, use of tables</p> <p>Differentiation introduction - gradient at a point (tangent and limits), understanding why it works</p> <p>Differentiation - standard method practice (including fractional and negative indices). And exponentials!</p> <p>Equations of tangents and normals</p> <p>Increasing and decreasing functions and stationary points</p> <p>Increasing and decreasing functions and stationary points</p> <p>Optimisation problems</p>	<p>Measures of location and variation 1 and 2: measures of central tendency: mean, median, mode including grouped data and using interpolation to find median also range, inter-quartile range and inter-percentile range including use of linear interpolation</p> <p>Measures of location and variation 1 and 2: measures of central tendency: mean, median, mode including grouped data and using interpolation to find median also range, inter-quartile range and inter-percentile range including use of linear interpolation</p> <p>Measures of location and variation 3: variance and standard deviation</p> <p>Coding for mean and standard deviation</p> <p>Single variable data 1: histograms and frequency polygons - possibly using big data set for examples, include mean and standard deviation for a histogram</p> <p>Single variable data 2: cumulative frequency diagrams and box and whisker plots - possibly using big data set for examples and including outliers</p> <p>Bivariate data: scatter graphs, correlation, and regression, independent and dependent variables. Interpolation and danger of extrapolation. Equation of line of best fit, and linear regression (note that students are not expected to calculate the PMCC or the equation of</p> <p>IT room lesson - Bivariate data using large data set - specific tasks Outliers and cleaning data: recognition and interpretation, choose appropriate data presentation techniques, clean the data - using the large data set.</p>	<p>Revision of Y12 content</p> <p>Exam Practice – using AS Level Papers</p> <p>PPE's</p> <p>Work Experience</p>
Summative assessment:	Summative assessment:	Summative assessment:
PPE's	Binomial, differentiation and trigonometry	PPE's

Key Stage 5

Year title / big question:	Year 13 Scheme	Year group:	13
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Autumn Term title:	Spring Term 1 title:	Summer Term 1 title:
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Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
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Work with radian measure, including use for arc length and area of sector
Know and use exact values of sin, cos and tan for common values
Understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan. Understand their relationships to sine, cosine and tangent. Understanding of their graphs; their ranges and domains. <u>Inverse functions and their graphs</u>
Understand and use; $sec^2\theta = 1 + tan^2\theta$ $cosec^2\theta = 1 + cot^2\theta$
Understand and use double angle formulae. Use of addition formulae, double angle formulae, R formula
Understand and use the derivative of sinx and cosx.
The second derivative and its connection to convex and concave sections of curves and points of inflection.
including problems involving connected rates of change and inverse functions

Understand and use addition of forces, resultant forces and dynamics for motion in a plane
Coefficient of friction, understand and use the model for friction, motion of a body on a rough surface, limiting frictions and statics.
Understand, use and derive the formulae for constant acceleration for motion in 2 dimensions using vectors
Use calculus in kinematics for motion in 2 dimensions using vectors
Model motion under gravity in a vertical plane using vectors. Projectiles.
Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables
Understand and use Newton's second law for motion in situations where forces need to be resolved (restricted to 2 dimensions)
Resolving forces in 2 dimensions
Equilibrium of a particle under coplanar forces
Simplify rational expressions including by factorising and cancelling, and algebraic division (by linear expressions only)
The modulus of a linear function
Understand and use composite functions
Combinations of transformations (translations and stretches)
Extend the binomial theorem to any rational value of n (including negatives and fractions), including its use for approximation and being aware of when the expansion is valid.

Revision
Filling in Gaps from QLA
A Level Past Papers

Summative assessment:	Summative assessment:	Summative assessment:
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Trig and Differentiation	PPE's	
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Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:
Intent and composite knowledge:	Intent and composite knowledge:	Intent and composite knowledge:
<p>Integrate standard functions and related sums, differences and constant multiples</p> <p>Use a definite integral to find the area between two curves. Understand and use integration as the limit of a sum</p> <p>Carry out simple cases of integration by substitution and integration by parts</p> <hr/> <p>Understand and use the Normal distribution as a model; find probabilities using the Normal distribution</p> <p>Link to histograms, mean, standard deviation, points of inflection and the binomial distribution</p> <p>Select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or Normal model may not be appropriate</p> <p>Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context</p> <hr/> <p>Understand and use the Normal distribution as a model; find probabilities using the Normal distribution</p> <p>Link to histograms, mean, standard deviation, points of inflection and the binomial distribution</p> <p>Select an appropriate probability distribution for a context, with appropriate reasoning, including recognising when the binomial or Normal model may not be appropriate</p> <p>Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance and interpret the results in context</p> <hr/> <p>Understand and use derived quantities and units: moment</p> <p>Understand and use moments in simple static contexts</p> <p>Use vectors in three dimensions</p> <p>Use vectors to solve problems in kinematics</p> <hr/> <p>Use trigonometric functions to solve problems in context, including problems involving vectors, kinematics and forces</p>	<p>Understand and use numerical integration of functions, including the use of the trapezium rule and estimating the approximate area under a curve and limits that it must lie between. Locate roots of $f(x) = 0$. Solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams</p> <p>Solve equations using the Newton-Raphson method and other recurrence relations</p> <p>Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms. Use parametric equations in modelling in a variety of contexts. Differentiate and integrate parametric equations.</p> <hr/> <p>Interpret scatter diagrams and regression lines for bivariate data,</p> <hr/> <p>Proof by contradiction</p>	
Summative assessment:	Summative assessment:	Summative assessment:
Integration	Mech and Stats Paper	

