Academic Overview 2018-19

Maths						
	Term 1.1	**Term 1.2**	**Term 2.1**	**Term 2.2**	**Term 3.1**	**Term 3.1**
Year 7	Place Value Calculations	Decimal Calculations Directed Numbers Units	Properties of 2D Shapes Areas	Types of Numbers Sequences Language of Algebra	Angles Fractions	Reading and Interpretting Tables and Graphs Percentages Medians Perimeters
Year 8	Estimation Ratio and Proportion Fractions Percentage Change	Angles Equations and Formulae	Probability Area	Mean and Comparing Data Coordinates Sequences	Transformations Constructions and Bearings	Plotting Linear Graphs Conversion Graphs Plans, Nets and Elevations
Year 9	Number Properties Rounding & Estimation FDP Fractions	Ratio Percentages 2D & 3D Shapes Angle Properties Angles & Polygons	Algebraic Expressions Algebraic Formulae Linear Equations Inequalities	Units of Measurements Perimeter & Area Populations and Samples Summary Statistics and Outliers	Coordinates and Functions Straight Line Graphs Pythagoras' Theorem Maps and Scale	Transformations 3D shapes Real life graphs
Year 10	Powers, roots & indices Standard Form Circumference & Area of a circle Surface Area & Volume of 3D shapes	Constructions and Loci Compound Measures Statistical Charts and Graphs	Exact form and Surds Trigonometry Sequences	Quadratic Equations Bounds Congruency nnd Similarity Graphs for grouped data (H)	Probability Manipulating Formulae Areas Under Graphs (H) Revision: Coordinates and Graphs (F)	Simultaneous Equations Circle Theorems (H) Equation of a cirlce (H) Revision: Angles (F) Revision : Areas (F) Revision Solving Equations (F)
Year 11	Surface Area & Volume of complex shapes Proportion Polynomials & Functions Pythagoras and Trigonometry (F) Trigonometry in non-right-angled triangles	Transforming Functions (H) Vectors (H) Algebraic Fractions (H) Iteration (H) Fractions (F) Symmetry and Transformations	Revision	Revision		

Year 10 (Higher) Curriculum Content Overview 2017-18

Maths Year 10 (Higher) Autumn Term 1				
Knowledge and Skills Students will be taught to….	Reading, Oracy, Literacy and Numeracy	Formative Assessment	Summative Assessment	Linked to
•Use positive integer indices •Calculate positive integer powers and exact roots. •Recognise simple powers of 2, •Simplify algebraic products and quotients. •Interpret and order numbers expressed in standard form. •Convert numbers to and from standard form. •Use a calculator to perform calculations with numbers in standard form. •Know and apply the formula circumference to calculate the circumference of a circle. •Know and apply the formula area to calculate the area of a circle. •Recognise and know the properties of the cube, cuboid, prism, cylinder, pyramid, cone and sphere. •Calculate the surface area and volume of cuboids and other right prisms (including cylinders).	Reading • Reading for meaning on problem solving questions. • Identifying the maths from a written question Oracy and Literacy • Key words and definitions • Explaining reasoning and methodology when solving mathematical problems	Questioning in lessons Whole class feedback during lessons Topic check-ins Individual questioning in lessons Individual verbal feedback in lessons	5 assessments throughout the academic year Topic check-ins	Inverse Operation Perimeter & Area

Assessment Skills, Knowledge and Concepts Map

Maths Year 10 (Higher) Autumn Term 1		
Key Learning Questions	**Powers, Roots and Indices**	**Reading**
Write $a^4 \times a^5$ as a single power Evaluate 3^{-2} Evaluate $125^{2/3}$	•Use positive integer indices to write, for example, •Calculate positive integer powers and exact roots. •Recognise simple powers of 2, •Simplify algebraic products and quotients. •Use negative integer indices to represent reciprocals •Calculate with integer powers. •Calculate with roots, combining index laws	• Reading for meaning on problem solving questions. • Identifying the maths from a written question
	Standard Form	**Oracy and Literacy**
Put the numbers in order smallest to largest 0.3×10^3, 30×10^2, 3, 3000×10^{-2} Without a calculator work out $2 \times 10^3 \times 6 \times 10^5$ giving your answer in standard form	•Interpret and order numbers expressed in standard form. •Convert numbers to and from standard form. •Use a calculator to perform calculations with numbers in standard form. •Add, subtract, multiply and divide numbers in standard form, without a calculator.	Literacy • Index, power, root, quotient, law, product, sum, integer, significant, decimal, circumference, arc, sector, radius, perimter, area, diameter, prism, pyramid, cone, depth, perpendicular
	Circumference and Area of a Circle	
Draw a circle and mark on a tangent What is the formula to work out area of a circle? What is the formula to work out circumference of a circle?	•Understand and use the terms centre, radius, chord, diameter and circumference. •Know and apply the formula circumference to calculate the circumference of a circle. •Know and apply the formula area to calculate the area of a circle. •Calculate the arc length of asector of a circle given its angle and radius. •Calculate the area of a sector of a circle given its angle and radius.	Oracy Explaining reasoning and methodology when solving mathematical problems
	Surface Area and Volume of 3D Shapes	
What is the difference between a surface area and a volume? What is the formula for the curved surface area of a cylinder?	•Recognise and know the properties of the cube, cuboid, prism, cylinder, pyramid, cone and sphere. •Calculate the surface area and volume of cuboids and other right prisms (including cylinders).	

Year 10 (Higher) Curriculum Content Overview 2017-18

Maths Year 10 (Higher) Autumn Term 2				
Knowledge and Skills **Students will be taught to….**	**Reading, Oracy, Literacy and Numeracy**	**Formative Assessment**	**Summative Assessment**	**Link to**
•Use and convert simple compound units •Interpret and construct charts appropriate to the data type; including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data. •Interpret multiple and composite bar charts. •Recognise graphical misrepresentation through incorrect scales, labels, etc. •Plot and interpret scatter diagrams for bivariate data. •Recognise correlation.	Reading • Reading for meaning on problem solving questions. • Identifying the maths from a written question Oracy and Literacy • Key words and definitions • Explaining reasoning and methodology when solving mathematical problems	Questioning in lessons Whole class feedback during lessons Topic check-ins Individual questioning in lessons Individual verbal feedback in lessons	5 assessments throughout the academic year Topic check-ins	Units of Measure Summary Statistics Cumulative Frequency

Assessment Skills, Knowledge and Concepts Map

Maths Year 10 (Higher) Autumn Term 2		
Key Learning Questions	**Constructions and Loci**	**Reading**
Write a set of instructions to construct a perperndicular bisector. Write a set of instructions to construct an angle bisector. How could you construct a 30° angle with just a pencil, compass and straight edge?	•Construct the perpendicular bisector and midpoint of a line segment. •Construct the bisector of an angle formed from two lines. •Construct the perpendicular from a point to a line. •Construct the perpendicular to a line at a point. •Know that the perpendicular distance from a point to a line is the shortest distance to the line. •Apply ruler and compass constructions to construct figures and identify the loci of points, to include real-world problems.	• Reading for meaning on problem solving questions. • Identifying the maths from a written question
		Oracy & Literacy
		Oracy • Explaining reasoning and methodology when solving mathematical problems
	Compound Measure	Literacy
What is the formulas for speed and density? What are the common units to measure speed and density?	•Use and convert simple compound units – Speed & rates of pay •Use and convert other compound units (e.g. density, pressure). •Use and convert compound units in algebraic contexts.	• Unit, speed, density, pressure, rate, perpendicular, bisect, angle, parallel, construct, equidistance, segment, midpoint
	Statistical Charts & Graphs	
What does it mean if two variables are positively correlated. What is continuous data, give three examples. Explain what an outlier is and how you recognise it on a scatter graph. Is extrapolated data reliable?	•Interpret and construct charts appropriate to the data type; including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data. •Recognise graphical misrepresentation •Plot and interpret scatter diagrams & recognise correlation •Design tables to classify data. Interpret and construct line graphs for time series data, and identify trends (e.g. seasonal variations). •Interpret correlation within the context of the variables, and appreciate the distinction between correlation and causation. •Draw a line of best fit by eye, and use it to make predictions. •Interpolate and extrapolate from data, and be aware of the limitations of these techniques. •Recognice outliers on a scatter graph	

Year 10 (Higher) Curriculum Content Overview 2017-18

Maths Year 10 (Higher) Spring Term 1				
Knowledge and Skills Students will be taught to….	**Reading, Oracy, Literacy and Numeracy**	**Formative Assessment**	**Summative Assessment**	**Link to**
•Use fractions in exact calculations without a calculator. • State answers in terms of Pi •Generate a sequence by spotting a pattern or using a term-to-term rule given algebraically or in words. •Find a position-to-term rule for simple arithmetic sequences, algebraically or in words. •Recognise sequences of triangular, square and cube numbers, and simple arithmetic progressions. •Know the trigonometric ratios •Know basic values for the trigonometric ratios Apply the basic trigonometric ratios	Reading • Reading for meaning on problem solving questions. • Identifying the maths from a written question Oracy and Literacy • Key words and definitions • Explaining reasoning and methodology when solving mathematical problems	Questioning in lessons Whole class feedback during lessons Topic check-ins Individual questioning in lessons Individual verbal feedback in lessons	5 assessments throughout the academic year Topic check-ins	Number Properties, Fraction, Pythagoras

Assessment Skills, Knowledge and Concepts Map

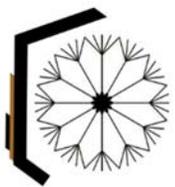| Maths Year 10 (Higher) SpringTerm 1		
Key Learning Questions	**Exact Form and Surds**	**Reading**
Simplify $\sqrt{12}$ Rationalise the denominator of $\frac{1+\sqrt{2}}{3-\sqrt{2}}$	•Use fractions in exact calculations without a calculator. •Use multiples of π in exact calculations without a calculator. •Simplify and calculate with numbers written in surd form including rationalising a denominator	• Reading for meaning on problem solving questions. • Identifying the maths from a written question
	Trigonometry	**Oracy and Literacy**
What types of triangles do we use for trigonometry? Write down the three trigonometric ratios. Write a step by step guide to fidning the missing angle using trigonometry. Write is the excat value of sin 30 ithout a calculator?	•Know and apply the trigonometric ratios, sinθ, cosθ and tanθ and apply them to find angles and lengths in right- angled triangles in 2D figures. •Know the exact values of sinθ and cosθ for θ = 0°, 30°, 45°, 60° and 90°. •Know the exact value of tanθ for θ = 0°, 30°, 45° and 60°.	Oracy • Explaining reasoning and methodology when solving mathematical problems Literacy • Exact, calculate, express, simplified, ratio, tri-,sequence, pattern, difference, arithmetic, geometric, recursive, quadratic
	Sequences	
Write down the first 15 square numbers. Draw pictures representing the trianglular numbers. Write down the nth term rule for these sequences 6, 11, 16, 21, 26, … 5, 8, 13, 20, 29, 40,… What is the name of this sequence? 1,1,2,3,58,…	•Generate a sequence by spotting a pattern or using a term-to-term rule given algebraically or in words. •Find a position-to-term rule for simple arithmetic sequences, algebraically or in words. •Recognise sequences of triangular, square and cube numbers, and simple arithmetic progressions. •Generate a sequence from a formula for the nth term. •Find a formula for the nth term of an arithmetic sequence. •Recognise Fibonacci and quadratic sequences, and simple geometric progressions •Use subscript notation for position-to-term and term-to- term rules. •Find a formula for the nth term of a quadratic sequence •Generate and find nth terms of other sequences.	

Year 10 (Higher) Curriculum Content Overview 2017-18

Maths Year 10 (Higher) Spring Term 2				
Knowledge and Skills Students will be taught to….	Reading, Oracy, Literacy and Numeracy	Formative Assessment	Summative Assessment	Link to
•Use a table of values to plot graphs of quadratic functions. •Expand products of two linear expressions e.g. (x+2)(x+3) •Factorise quadratic expressions of the form $x^2 + bx + c$. •Solve quadratic equations with coefficient of x^2 equal to 1 by factorising. •Use inequality notation to write down an error interval for a number or measurement rounded or truncated to a given degree of accuracy. •Apply and interpret limits of accuracy. •Identify congruent triangles. •Identify similar triangles. •Compare lengths, areas and volumes using ratio notation and scale factors. •Prove that two triangles are congruent using the cases: •Apply congruent triangles in calculations and simple proofs. •Prove that two triangles are similar. •Apply similarity to calculate unknown lengths in similar figures. •Interpret and construct diagrams for grouped data as appropriate	Reading • Reading for meaning on problem solving questions. • Identifying the maths from a written question	Questioning in lessons Whole class feedback during lessons Topic check-ins Individual questioning in lessons Individual verbal feedback in lessons	5 assessments throughout the academic year Topic check-ins	Linear Equations, Simultaneous Equations, Units of measurements, Inequalities, Transformations, Trigonometry Statistics, Charts & Graphs

Assessment Skills, Knowledge and Concepts Map

Maths Year 10 (Higher) Spring Term 2		
Key Learning Questions	**Quadratic Equations**	**Reading**
Draw the graph of $y=x^2+3x-1$ Expand the brackets $(x+3)(x-2)$ Factorise x^2+5x+6 What is the minimum point of x^2+8x-3	• Use a table of values to plot graphs of quadratic functions. • Expand products of two linear expressions e.g. $(x+2)(x+3)$ • Factorise quadratic expressions of the form $x^2 + bx + c$. • Solve quadratic equations with coefficient of x^2 equal to 1 by factorising.	• Reading for meaning on problem solving questions. • Identifying the maths from a written question
	Bounds	**Oracy and Literacy**
If a van is 6 metres long to the nearest metre what is the error interval for the length.	• Use inequality notation to write down an error interval for a number or measurement rounded or truncated to a given degree of accuracy. • Apply and interpret limits of accuracy.	Oracy • Explaining reasoning and methodology when solving mathematical problems Literacy • Solve, quadratic, factorise, expands, sketch, plot, function, expression, coefficient, curve, smooth, minimum, macimum, congruent, similar, hypotenuse, limit, bound
	Congruence and Similarity	
Explain what congruent shapes are. What are the conditions needed for two triangles to be congruent? How can we check that shapes are similar? What is the scale factor of the area and volume of a shape if the lenghts have a factor of 3?	• Identify congruent triangles. • Identify similar triangles. • Compare lengths, areas and volumes using ratio notation and scale factors. • Prove that two triangles are congruent using the cases: • Apply congruent triangles in calculations and simple proofs. • Prove that two triangles are similar. • Apply similarity to calculate unknown lengths in similar figures.	
	Graphs for Grouped Data	
Explain how you find the total frequency given a histogram	• Interpret and construct diagrams for grouped data as appropriate	

Year 10 (Higher) Curriculum Content Overview 2017-18

Maths Year 10 (Higher) Summer Term 1				
Knowledge and Skills **Students will be taught to….**	**Reading, Oracy, Literacy and Numeracy**	**Formative Assessment**	**Summative Assessment**	**Link to**
•Use the probability scale as a measure of likelihood •Record, describe and analyse the relative frequency of outcomes of repeated experiments •Use relative frequency as an estimate of probability. •Calculate probabilities, expressed as fractions or decimals, for example flipping coins, rolling dice, etc. •Calculate probabilities of simple combined events, •Use probabilities to calculate the number of expected outcomes in repeated experiments •Use systematic listing strategies •Use a two-circle Venn diagrams and use this to calculate related probabilities. •Use simple set notation to describe simple sets of numbers or objects. •Use the addition law for mutually exclusive events. •Use p(A) + p(not A) = 1 •Rearrange formulae to change the subject, where the subject appears once only. • Calculate or estimate areas under graphs • Interpret areas in contexts	Reading • Reading for meaning on problem solving questions. • Identifying the maths from a written question	Questioning in lessons Whole class feedback during lessons Topic check-ins Individual questioning in lessons Individual verbal feedback in lessons	5 assessments throughout the academic year Topic check-ins	Fractions, Decimals & Percentages, Algebraic Formulae

Assessment Skills, Knowledge and Concepts Map

ERASMUS DARWIN ACADEMY

Excellence for All

Maths Year 10 (Higher) Summer Term 1		
Key Learning Questions	**Probability**	**Reading**
A bag has 3 red counters and 5 blue counters, a counter is chosen at random, replaced and a new counter chosen. What is the probability the counters were both the same colour? What section of a Venn diagam is represented by A∩B? Explain what is meant by mutually exclusive events. There are 3 cans of cola, 5 cans of lemonade and 4 cans of orange. What is the probability you choose three different flavours when selecting cans at random?	•Use the probability scale as a measure of likelihood •Record, describe and analyse the relative frequency of outcomes of repeated experiments •Use relative frequency as an estimate of probability. •Calculate probabilities, expressed as fractions or decimals, for example flipping coins, rolling dice, etc. •Calculate probabilities of simple combined events, •Use probabilities to calculate the number of expected outcomes in repeated experiments •Use systematic listing strategies •Use a two-circle Venn diagrams and use this to calculate related probabilities. •Use simple set notation to describe simple sets of numbers or objects. •Use the addition law for mutually exclusive events. •Use p(A) + p(not A) = 1 •Understand that relative frequencies approach the theoretical probability as the number of trials increases. •Use sample spaces for more complex combinations of events •Use set notation to describe a set of numbers or objects. •Use tree diagrams to record the probabilities of successive events	• Reading for meaning on problem solving questions. • Identifying the maths from a written question
		Literacy and Oracy
		Oracy • Explaining reasoning and methodology when solving mathematical problems Literacy • Probability, outcome, event, likelihood, trial, set, frequency, subject, coefficient, inverse, union, intersection
	Manipulating Formulae	
Write R as the subject of the formula V=IR Write a as the subject of v=u+2as Write x as the subject of $y = \frac{x+5}{x}$	•Rearrange formulae to change the subject, where the subject appears once only. •Rearrange formulae to change the subject, including cases where the subject appears twice, or where a power or reciprocal of the subject appears.	
	Area Under Graphs	
On a velocity-time graph what doe sthe area under the graph represent?	• Calculate or estimate areas under graphs • Interpret areas in contexts	

Year 10 (Higher) Curriculum Content Overview 2017-18

Maths Year 10 (Higher) Summer Term 2				
Knowledge and Skills Students will be taught to….	Reading, Oracy, Literacy and Numeracy	Formative Assessment	Summative Assessment	Link to
•Solve linear equations •Set up and solve pairs of equations algebraically, with one being quadratic •Recognise that the solution to a pair of simultaneous equations is the intersection of their graphs •Recognise and use the equation of a circle with centre at the origin. •Calculate the equation of a tangent to a circle at a given point • Apply and prove angle laws in regards to angles and lengths of lines	Reading • Reading for meaning on problem solving questions. • Identifying the maths from a written question	Questioning in lessons Whole class feedback during lessons Topic check-ins Individual questioning in lessons Individual verbal feedback in lessons	5 assessments throughout the academic year Topic check-ins	Linear Equations, Quadratics Equations, Angles, Similarity and Congruence,

Assessment Skills, Knowledge and Concepts Map

Maths Year 10 (Higher) Summer Term 2		
Key Learning Questions	**Simultaneous Equations**	**Reading**
Solve the simultaneous equations algebraically x + 3y = 8 2x + y = 1 $y=x^2+3x-1$ y=2x+1	•Set up and solve two linear simultaneous equations in two variables algebraically. •Use graphs to find approximate roots of quadratic equations and the approximate solution of two linear simultaneous equations. •Set up and solve two simultaneous equations (one linear and one quadratic) in two variables algebraically. •Know that the coordinates of the points of intersection of a curve and a straight line are the solutions to the simultaneous equations for the line and curve	• Reading for meaning on problem solving questions. • Identifying the maths from a written question
		Oracy and Literacy
		Oracy • Explaining reasoning and methodology when solving mathematical problems Literacy • Solution, coeffiecient, equations, equal, manipulate, quadratic, intersection, plot, quadratics, theorem, radius, tangent, subtended, alternate, segment, perpendicular, cyclic quadrilateral, bisect
	Circle Theorems	
Draw a diagram to represent each of the circle theorems.	•Apply and prove: ➢ the angle at the centre is twice the angle on the circle ➢ The angle on the circle, subtended by the diameter is 90˚ ➢ two angles in the same segment are equal. ➢ a radius or diameter will be the perpendicular bisector of a chord ➢ a tangent at a point on the circle is perpendicular to a raduis to that point ➢ the opposite angles of a cyclic quadrilateral add up to 180° ➢ the tangents from the same point outside of the circle are the same length ➢ the alternate segment theorem	
	Equation of a Circle	
Draw the circle with equation $x^2+y^2=25$ At what points does this cirlce and the line y=x intersect?	•Recognise and use the equation of a circle with centre at the origin. •Calculate the equation of a tangent to a circle at a given point	