Curriculum Area: Maths **Year:** 10
2015/2016

Topics	Year Curriculum	How you can support learning at home, eg. Books, websites, family learning through visits.
Module 1 Algebra	**Equations, formulae, expressions and identities** ●● know and use the index laws in generalised form for multiplication and division of integer powers ●● square a linear expression; expand the product of two linear expressions of the form $x \pm n$ and simplify the corresponding quadratic expression; establish identities such as $a2-b2=(a+b)(a-b)$ ●● solve linear equations in one unknown with integer and fractional coefficients; solve linear equations that require prior simplification of brackets, including those with negative signs anywhere in the equation ●● solve linear inequalities in one variable; represent the solution set on a number line ●● solve a pair of simultaneous linear equations by eliminating one variable; link a graph of an equation or a pair of equations to the algebraic solution; consider cases that have no solution or an infinite number of solutions ●● derive and use more complex formulae; change the subject of a formula, including cases where a power of the subject appears in the question or solution, e.g. find given that $A= r2$ **Sequences, functions and graphs** ●● find the next term and the nth term of quadratic sequences and explore their properties; deduce properties of the sequences of triangular and square numbers from spatial patterns ●● plot the graph of the inverse of a linear function ●● understand that equations in the form $y=mx+c$ represent a straight line and that m is the gradient and c is the value of the y -intercept; investigate the gradients of parallel lines and lines perpendicular to these lines ●● explore simple properties of quadratic functions; plot graphs of simple quadratic and cubic functions, e.g. $y=x2$, $y=3x2+4$, $y=x3$ ●● understand that the point of intersection of two different lines in the same two variables that simultaneously describe a real situation is the solution to the simultaneous equations represented by the lines	BBC Bitesize website Mathswatch personal tutor CD http://www.mathswatch.co.uk/#/gcse/4554948524 Edexcel Foundation/Higher Revision guides & workbooks available from Edexcel www.mymaths.co.uk

Module 2 Number	**Place value, ordering and rounding** ●● express numbers in standard index form, both in conventional notation and on a calculator display ●● convert between ordinary and standard index form representations ●● round to a given number of significant figures; use significant figures to approximate answers when multiplying or dividing large numbers **Integers, powers and roots** ●● use index notation with negative and fractional powers, recognising that the index laws can be applied to these as well **Fractions, decimals, percentages, ratio and proportion** ●● distinguish between fractions with denominators that have only prime factors 2 or 5 (terminating decimals), and other fractions (recurring decimals) ●● understand and apply efficient methods to add, subtract, multiply and divide fractions, interpreting division as a multiplicative inverse ●● understand and use proportionality and calculate the result of any proportional change using multiplicative methods ●● calculate an original amount when given the transformed amount after a percentage change; use calculators for reverse percentage calculations by doing an appropriate division **Number operations** ●● recognise and use reciprocals; understand 'reciprocal' as a multiplicative inverse; know that any number multiplied by its reciprocal is 1, and that zero has no reciprocal because division by zero is not defined **Mental calculation methods** ●● make and justify estimates and approximations of calculations by rounding numbers to one significant figure and multiplying or dividing mentally **Calculator methods** ●● use an extended range of function keys, including the reciprocal and trigonometric functions ●● use standard index form, expressed in conventional notation and on a calculator display; know how to enter numbers in standard index form **Checking results** ●● check results using appropriate methods	Edexcel Past Papers Mobile Phone App Springs VLE Nrich Maths: http://nrich.maths.org/teacher-secondary
Module 3 Shape and Space	**Geometrical reasoning** ●● distinguish between practical demonstration and proof in a geometrical context	

	●● solve multi-step problems using properties of angles, of parallel lines, and of triangles and other polygons, justifying inferences and explaining reasoning with diagrams and text ●● know that the tangent at any point on a circle is perpendicular to the radius at that point; explain why the perpendicular from the centre to the chord bisects the chord ●● know that if two 2-D shapes are similar, corresponding angles are equal and corresponding sides are in the same ratio; understand from this that any two circles and any two squares are mathematically similar while in general any two rectangles are not ●● understand and apply Pythagoras' theorem when solving problems in 2-D and simple problems in 3-D ●● understand and use trigonometric relationships in right-angled triangles, and use these to solve problems, including those involving bearings **Transformations and coordinates** ●● transform 2-D shapes by combinations of translations, rotations and reflections, on paper and using ICT; use congruence to show that translations, rotations and reflections preserve length and angle ●● use any point as the centre of rotation; measure the angle of rotation, using fractions of a turn or degrees; understand that translations are specified by a vector ●● enlarge 2-D shapes using positive, fractional and negative scale factors, on paper and using ICT; recognise the similarity of the resulting shapes; understand and use the effects of enlargement on perimeter ●● find the points that divide a line in a given ratio, using the properties of similar triangles; calculate the length of AB, given the coordinates of points A and B **Construction and loci** ●● understand from experience of constructing them that triangles given SSS, SAS, ASA or RHS are unique, but that triangles given SSA or AAA are not ●● find the locus of a point that moves according to a more complex rule, both by reasoning and by using ICT **Measures and mensuration** ●● understand and use measures of speed (and other compound measures such as density or pressure); solve problems involving constant or average rates of change ●● solve problems involving lengths of circular arcs and areas of sectors ●● solve problems involving surface areas and volumes of cylinders	

Module 4 Handling Data & Probability	**Specifying a problem, planning and collecting data** ●● independently devise a suitable plan for a substantial statistical project and justify the decisions made ●● identify possible sources of bias and plan how to minimise it ●● break a task down into an appropriate series of key statements (hypotheses), and decide upon the best methods for testing these ●● gather data from primary and secondary sources, using ICT and other methods, including data from observation, controlled experiment, data logging, printed tables and lists **Processing and representing data** ●● use an appropriate range of statistical methods to explore and summarise data; including estimating and finding the mean, median, quartiles and interquartile range for large data sets (by calculation or using a cumulative frequency diagram) ●● select, construct and modify, on paper and using ICT, suitable graphical representation to progress an enquiry and identify key features present in the data. Include: – cumulative frequency tables and diagrams – box plots – scatter graphs and lines of best fit (by eye **Interpreting and discussing results** ●● analyse data to find patterns and exceptions, and try to explain anomalies; include social statistics such as index numbers, time series and survey data ●● appreciate that correlation is a measure of the strength of association between two variables; distinguish between positive, negative and zero correlation, using lines of best fit; appreciate that zero correlation does not necessarily imply 'no relationship' but merely 'no linear relationship' ●● examine critically the results of a statistical enquiry; justify choice of statistical representations and relate summarised data to the questions being explored **Probability** ●● use tree diagrams to represent outcomes of two or more events and to calculate probabilities of combinations of independent events ●● know when to add or multiply two probabilities: if A and B are mutually exclusive, then the probability of A or B occurring is P(A) + P(B), whereas if A and B are independent events, the probability of A and B occurring is P(A) × P(B)	

	●● understand relative frequency as an estimate of probability and use this to compare outcomes of experiments	
Module 5 Mathematical Processes and Applications	**Representing** ●● compare and evaluate representations; explain the features selected and justify the choice of representation in relation to the context **Analysing – use mathematical reasoning** ●● identify a range of strategies and appreciate that more than one approach may be necessary; explore the effects of varying values and look for invariance and covariance in models and representations; examine and refine arguments, conclusions and generalisations; produce simple proofs **Interpreting and evaluating** ●● make sense of, and judge the value of, own findings and those presented by others; judge the strength of empirical evidence and distinguish between evidence and proof; justify generalisations, arguments or solutions **Communicating and reflecting** ●● use a range of forms to communicate findings effectively to different audiences; review findings and look for equivalence to different problems with similar structure	Using Maths at home in a real life context, ie planning floor space in a bedroom, calculating coverage of a wall in paint and the cost of tins of paint, converting measurements for ingredients in cooking etc