Rayner Stephens HIGH SCHOOL

Year 10 – Mathematics – Foundation Tier						
Curriculum intent	Mathematics is a creative and highly interconnected discipline. It is essential to everyday life; underpinning many other subjects such as science, geography and technology and is essential for most forms of employment. Through mathematics lessons we promote mathematical thinking to allow all learners to achieve their mathematical potential and engage in the study of mathematics. Learners are taught strategies to solve problems and are encouraged by teacher modelling to be able to express themselves in mathematical language. The Key Stage 4 scheme of learning builds on the understanding of the interconnected topics from Key Stage 3. Learners will retrieve, affirm and extend their knowledge and understanding as we progress through the curriculum. Learners will follow either the Foundation tier or the Higher Tier pathway. Learners are regularly assessed to ensure that they are following the correct pathway in Mathematics. The journey at the start of KS4 begins with data handling, learning how to display data to enable comparisons, interpretation and to calculate the probability of different events taking place. Learners are encouraged to develop their analytical, problem solving and reasoning skills in these topics; key skills that are required throughout their GCSE studies. Consolidation and further in-depth study of essential number skills follows with fractions and ratio, proportional reasoning and percentages. Year 10 continues by moving into algebra where learners will study index laws and will be solving equations, rearranging equations, and solving inequalities before returning to geometry. They will develop their geometrical reasoning when studying angles, plans and elevations and bearings. Geometrical skills are further enhanced through Pythagoras and trigonometry. In the final term of Year 10, learners will refine their data handling skills by studying averages and different ways in which to present data. They will critically examine the data to look for trends, make predictions and spot any potential bias. Graphs of different types will be studied, and learners will develop skills in reading, interpreting and analysing data from graphs, including algebraic and real life graphs, such as conversion graphs and distance-time graphs.					
Term	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Knowledge	• Two-way tables • Frequency trees • Rounding and Error Intervals • Fractions • Ratio • Direct Proportion • Proportion - Best Buy, Recipes and Exchange Rates • Inverse Proportion	• Percentages • Interest and Growth • Depreciation and Decay • Reverse Percentages • Index Laws • Expand and Simplify • Sequences • Solving Equations	• Forming and Solving Equations • Inequalities • Factorising • Changing the Subject • Standard Index Form • Angles, Parallel Lines, Interior and Exterior Angles • Plans and Elevations • Bearings	• Pythagoras • Trigonometry - Finding Sides and Angles and Non-Calc • Pythagoras with Trigonometry • Circles • Arcs and Sectors • Surface Area and Volume • Sampling	• Averages • Averages from a Table • Averages from Grouped Data • Frequency Diagrams • Scatter Graphs • Time Series • Pie Charts	• Straight Line Graphs • Non-linear Graphs • Coordinate Geometry • Speed, Distance, Time • Compound Measures • Real-life Graphs • Congruence • Similar Shapes

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Skills	• Read, use, interpret and design two-way tables and frequency trees. • Round to a given degree of accuracy and use inequality notation to specify error intervals due to truncation or rounding. • Use the four operations with fractions and mixed numbers. • Simplify, compare and use equivalent ratios. • Share an amount in a ratio • Write ratios in form 1 : n or n : 1 • Solve problems involving direct proportion, including worded problems, using graphs and using the unitary method. Calculate the best buy or convert currencies. •Understand the relationship between direct proportion and inverse proportion. Solve problems using inverse proportion.	• Find a percentage of a quantity. • Calculate percentage increase/decrease both with and without a calculator. • Make calculations involving repeated percentage change. • Find the original amount when given the new amount. • Use the laws of indices to multiply and divide numbers and/or algebraic terms written in index notation. • Manipulate and simplify algebraic expressions. • Recognise and find the next term of sequences, including linear, quadratic, Fibonacci etc. • Find and use the nth term of an arithmetic sequence. • Solve linear equations, in which the unknown appears on either side or on both sides of the equation, including brackets and fractional and/or negative terms.	• Form and solve equations in various contexts. • Show/read inequalities on number lines and solve linear inequalities. • Factorise algebraic expressions by taking out common factors. • Factorise quadratic expressions. • Change the subject of a formula including one step, two steps, both sides and use of squares and square roots. • Convert large and small numbers into standard form and vice versa. • Use the four operations with numbers in standard form, with or without a calculator. • Find missing angles using angle facts and demonstrate understanding of the properties of angles in 2D shapes and in parallel lines. • Understand and draw front and side elevations and plans of shapes. • Read, use and interpret bearings.	• Use Pythagoras' Theorem in 2D. • Use the trigonometric ratios sine, cosine and tan, to find angles and lengths in 2D figures. • Know the exact values trigonometric ratios for given degrees. • Recall and use formulae for the circumference and area of a circle. • Calculate the area and perimeter of compound shapes made from triangles, rectangles, trapezia, circles and parallelograms. • Find the surface area of prisms, including compound solids. • Find the volume of prisms including compound solids. • Convert between metric measures. • Plan, collect and analyse data to complete a statistical investigation.	• Calculate and interpret the mean, median, mode and range from discrete data. • Calculate and interpret the averages calculated from grouped data. • Produce and interpret frequency diagrams for discrete and continuous data. • Interpret line graphs. • Draw and interpret scatter graphs. Draw a line of best fit. Interpolate and extrapolate trends. Identify and interpret correlation. • Construct and interpret time-series graphs and comment on trends. • Read, draw and interpret pie charts.	• Plot, draw and interpret straight line graphs, with or without a table of values. • Plot, draw and interpret quadratic, cubic and reciprocal graphs. • Be able to recognise a type of graph from its shape. • Interpret and use $y = mx + c$ with straight line graphs. • Understand, use and convert between metric speed measures. • Calculate using speed, distance and time. • Understand and calculate with pressure, force and area. • Read, draw and interpret real life graphs such as conversion and distance-time graphs. • Identify and use the rules of congruence for triangles. • Identify similar shapes, find and use the scale factor to find missing lengths.

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Assessments	• Regular low stakes assessments at the end of each topic. • Past GCSE Paper – non-calculator.	• Regular low stakes assessments at the end of each topic.	• Regular low stakes assessments at the end of each topic. • Past GCSE Paper – calculator.	• Regular low stakes assessments at the end of each topic.	• Regular low stakes assessments at the end of each topic. • Year 10 Mock Week Past GCSE Paper series. 1 x – non-calculator 2 x calculator	• Regular low stakes assessments at the end of each topic. • Past GCSE paper – calculator.
Enrichment	• Have you had your five a day? Consolidate your learning by completing the Corbettmaths five a day. Visit https://corbettmaths.com/ to find daily questions to challenge you. • Plan a holiday. Will you choose to go abroad? What would the costs be? Do you need to convert currencies? How do you know you are getting the best value for money? • Need some help with finances? Use the RBS MoneySense to help you make the most of your money. https://rbs.mymoneysense.com/home/	• Been asked to take part in the UKMT Maths Challenge in February? Visit https://www.interactive-maths.com/ukmt-random-question-generator.html to try out some of the questions. • Would you trust the tabloids? Match the cards and figure it out on https://nrich.maths.org/12172 • What careers can you find that use algebra? Research where it is used in real life and write a newspaper article to summarise your findings.	• Can you draw a plan, side and front elevation of Rayner Stephens High School? • How would you design a stadium so that all spectators had a good view? https://nrich.maths.org/7484 • What is the link with the game Tetris and maths? Can you explain? Have a go at Factris on to get you started. https://mathigon.org/factris	• Why might a bricklayer need to know the importance of 3, 4, 5 bricks? How can you help with that? • Can you use your surface area understanding to crack the following problem? https://nrich.maths.org/ninecolours • Can you crack the code? Use your code breaking and cipher skills and take part in the Alan Turing Cryptography Competion on https://www.maths.manchester.ac.uk/cryptography_competition/	• Data handling is studied in this half term. Where can you find statistics being used to persuade you? Look in newspapers and check advertisements to see if you think their claims are as good as they seem? • Consider how diagrams can be misleading – why might they do so, and can you present the data in a different way? • Why would people lie when answering a questionnaire and what can you do about it? Try this https://nrich.maths.org/13897 to discover more.	• Being green is a good thing but take the carbon footprints challenge. Analyse the data to test it yourself. https://nrich.maths.org/6508 • Can you solve the speed-time problems at the Olympics? https://nrich.maths.org/7322 • Apply your graphs skills to real-life properties and applications of graphs and networks on https://mathigon.org/course/graph-theory/introduction