

Long Term Plan: Maths

National Curriculum Aims	<ul style="list-style-type: none"> All pupils become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately All pupils reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language All pupils can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions 				
Assessment Objectives (AQA)	<p>AO1: Use and apply standard techniques Students should be able to:</p> <ul style="list-style-type: none"> accurately recall facts, terminology and definitions use and interpret notation correctly accurately carry out routine procedures or set tasks requiring multi-step solutions. <p>AO2: Reason, interpret and communicate mathematically Students should be able to:</p> <ul style="list-style-type: none"> make deductions, inferences and draw conclusions from mathematical information construct chains of reasoning to achieve a given result interpret and communicate information accurately present arguments and proofs assess the validity of an argument and critically evaluate a given way of presenting information. <p>AO3: Solve problems within mathematics and in other contexts Students should be able to:</p> <ul style="list-style-type: none"> translate problems in mathematical or non-mathematical contexts into a process or a series of mathematical processes make and use connections between different parts of mathematics interpret results in the context of the given problem evaluate methods used and results obtained evaluate solutions to identify how they may have been affected by assumptions made. 				
Assessment principles	<p>Formative assessment Y7-Y9: Students will be assessed on each section of each component. This will be done by monitoring progress in class, giving both written and oral feedback and through peer and self-assessment. From Year 8 students will be given past exam questions; from Y9 these will cover multiple levels of difficulty</p> <p>Summative assessment Y7-Y9: At the end of each component the students will sit a teacher devised assessment</p> <p>The Mathematics Tracker will be used in support of progress and identifying gaps and or areas for intervention support. This is particularly important for Year 8 as many of the learners at Howard House have periods of no education for Primary or KS3</p> <p>Formative assessment Y10 & Y11: students will be informally assessed throughout each half term on their use and application of standard techniques for GCSE Foundation Mathematics in the stipulated topics. Specific focus will be paid to (AO1), Reasoning, interpretation and communication of mathematics (AO2) and ability to solve problems with mathematics in other contexts (AO3). This will be done by monitoring progress in class, giving both written and oral feedback and through peer and self-assessment. The Mathematics Tracker will be used in support of progress and identifying gaps and or areas for intervention support.</p> <p>Summative assessment Y10 & Y11: Mock GCSE to take place and end of term assessment. (AO1), (AO2), (AO3).</p>				
Term	Year 7	Year 8	Year 9	Year 10	Year 11
Term 1.1	<p>Topic/s:</p> <ul style="list-style-type: none"> Component 1- properties of number component 2- the four operations <p>The main aim this half term is to ensure learners have consolidated their Key Stage 2 knowledge on 'Number'. Targeted</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Number <p>Students will develop their skills to read, write and order integers, decimals, percentages and fractions. While also working on calculations through</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Number <p>Students will develop their skills to read, write and order integers, decimals, percentages and fractions. While also working on calculations through multiplication and division facts, BIDMAS,</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Number <p>In addition to consolidating subject content from Key Stage 3 (AO1), pupils should be taught to:</p> <ul style="list-style-type: none"> Apply systematic listing strategies, estimate, calculate with roots and 	<p>Topic/s:</p> <ul style="list-style-type: none"> Number <p>Learners will now have a base knowledge for Foundation GCSE AQA curriculum requirements and should have successfully completed their Functional Skills level 1 qualification(AO1).</p>

	intervention will be given for those learners presenting with gaps in their KS2 knowledge (AO1) (AO2). Students will develop their skills and learn how to apply them into multi step problems (AO3).	multiplication and division facts, BIDMAS, square numbers. Students will be able to accurately recall and use the facts in multi-step equations accurately, fluently and with reason to solve a range of problems. (AO1), (AO2), (AO3).	square numbers and roots in more complicated problems. Students will be able to accurately recall and use the facts in multi-step equations accurately, fluently and with reason to solve a range of problems. (AO1), (AO2), (AO3).	integers, percentages, fractions, decimals, surds, calculate with numbers in standard form $A \times 10^n$, where $\leq A < 10$ and n is an integer, identify, apply and interpret limits of accuracy when rounding (AO1), (AO2). Learners will bridge their GCSE knowledge for end of Year 11 examinations, and work towards their Level 1 Functional Skills Examinations in January. Number is an intricate component in the Functional Skills Curriculum. Additional foci for this examination will be delivered within intervention time. All students have extensive intervention time on an afternoon. Functional Skills not only offer an alternative calculation but allow for the transference of Math to real-life settings(AO1).	Learners in consolidating their KS4 Foundation knowledge and developing their higher paper knowledge for GCSE where appropriate. For example in: <ul style="list-style-type: none"> Applying systematic listing strategies, calculate with roots, and with integers, percentages, fractions, decimals and indices, calculate exactly with fractions, surds; simplify surd expressions involving squares (AO1), (AO2). Learners continuing to emerge in their Foundation Knowledge will remain at this stage. Only those learners with clear consolidation will work for Higher paperwork when evidence is shown of their Foundation ability that is void of gaps. All learners will sit a Level 2 Functional Skills Qualification in January (AO1).
Term 1.2	<p>Topic/s:</p> <ul style="list-style-type: none"> Component 3- Ratio Component 4- Money <p>To provide students with the basic mathematical knowledge of ratio and money to then develop these skills through the functional skills level and up to GCSE. Students will develop the use of more mathematical facts and terminology to access the next step through the curriculum (AO1). Students will learn how to apply these skills to problems to proof, validate arguments and translate problems in order to apply the correct facts (AO2), (AO3).</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Number and basic formulae <p>Students will continue with number, they will look in to more detail with fractions, decimals and percentages and how to calculate amounts using these (AO1), (AO2) as well as calculating percentage increase and decrease using real life examples through the use of different formulas, linking in to algebra and substituting in to formulae. (AO1), (AO2), (AO3).</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Number and algebra <p>Students will apply the rules of ordering and comparing numbers (decimals and negatives) using inequalities signs to do this, as well as apply all four operations to each. Students will develop their knowledge and skills in formulae by evaluating expressions, rearranging, substituting and writing formulae as words and symbols. (AO1), (AO2), (AO3).</p> <p>Students will be given practice exam questions, covering multiple levels of difficulty.</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Algebra <p>In addition to consolidating subject content from Key Stage 3, pupils will be learning the base knowledge for Key Stage 4 curriculum requirements for Foundation GCSE (AO1).</p> <ul style="list-style-type: none"> Simplifying and manipulating algebraic expressions, factorising quadratic expressions of the form $x^2 + bx + c$ Simplifying expressions involving sums, products and powers, including laws of indices Know the difference between an equation and an identity Argue mathematically to show algebraic expressions are equivalent. <p>Use algebra to support and construct arguments {and proofs} (AO1), (AO2), (AO3).</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Algebra <p>In addition to consolidating subject content from Key Stage 3, pupils will be learning the base knowledge for Key Stage 4 curriculum requirements for Foundation GCSE (AO1). I will be teaching learners additional skills for GCSE that are pitched for the Higher paper where appropriate, for example</p> <ul style="list-style-type: none"> Recognizing and using sequences and simple geometric progressions. Higher ability includes other sequences such as Fibonacci-type sequences and quadratic sequences (AO1), (AO2), (AO3).
Term 2.1	<p>Topic/s:</p> <ul style="list-style-type: none"> Component 5- The calendar and time <p>Learners will be aware of the calendar, calendar months, weeks, days, hours and minutes. This is important for students to understand for the next steps in the curriculum and an essential life skill.</p>	<p>Topic/s: Number</p> <ul style="list-style-type: none"> Number, ratio and proportion <p>Students again, will develop their skills to calculate interest and depreciation, this will be done by looking at real life problems, such as price and car prices. Students will look at what ratio is (how to simplify and divide amounts in to a given ratio), direct</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Shape space and ratio <p>Learners will give examples and demonstrate conversation between the metric and imperial units system, building upon previous knowledge by interpreting and applying conversation factors and conversation graphs. Student will recall area</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Ratio, proportion and rates of change <p>Learners should have successfully consolidated their Key Stage 4 knowledge of Ratio, Proportion and Rates of Change by year 10 and be successfully working towards</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Ratio, proportion and rates of change <p>This year, learners will be imminently sitting their GCSE's, therefore, I will be ensuring that learners should have successfully consolidated their Key Stage 4 knowledge of Ratio, Proportion and Rates of Change by</p>

		proportion and bust buy. Students will have to use the facts they learned last half term. (AO1), (AO2), (AO3).	and perimeter factors and learn the properties of a circle how to correctly apply pi to circles to calculate area and circumference, this will also be applied to 3d shapes and volume, including cylinders. (AO1), (AO2), (AO3).	their Foundation GCSE curriculum content demands. For example <ul style="list-style-type: none"> Convert between related compound units (speed, rates of pay, prices, density, pressure) in numerical and algebraic contexts. Interpret equations that describe direct and inverse proportion. (AO1), (AO2), (AO3). 	year 10 and be successfully working towards their Foundation GCSE curriculum content demands. For example <ul style="list-style-type: none"> Set up, solve and interpret the answers in growth and decay problems, including compound interest. In addition to the Foundation knowledge, learners will work to achieve the more iterative processes attuned to the Higher specification for GCSE. (AO1), (AO2), (AO3).
Term 2.2	Topic/s: <ul style="list-style-type: none"> Component 6- Measures Learners will be introduced to basics of measures, this will provide the basis for being able to access the functional skills curriculum.	Topic/s: <ul style="list-style-type: none"> Shape, space and measure Students will begin by recalling the facts of unit of measure, properties of 2D and 3D shapes and demonstrating an understanding of symmetry and relative size of angles. Students will develop their use of formulae when they begin to calculate area, perimeter and volume of simple, composite and more difficult shapes. (AO1), (AO2), (AO3).	Topic/s: <ul style="list-style-type: none"> Shape, space and measure Learners will continue to apply the skills and knowledge they have developed throughout the year to then build on last year's term 2.2 in more depth. Students will build upon interest and depreciation by calculation compound interest and look at scale drawings, co-ordinates and plans and elevation in more depth. (AO1), (AO2), (AO3).	Topic/s: <ul style="list-style-type: none"> Geometry Learners should have successfully consolidated their Key Stage 4 knowledge of Geometry and be successfully working towards their Foundation GCSE curriculum content demands (AO1). For example <ul style="list-style-type: none"> Use of standard conventions for labelling and referring to the sides and angles of triangles. Applying the properties of angles at a point, alternative and corresponding angles on parallel lines and deriving and using the sum of angles in a triangle (e.g. to deduce and use the sum in any polygon, and to derive properties of regular polygons) Identify and apply circle definitions and properties (AO1), (AO2). 	Topic/s: <ul style="list-style-type: none"> Geometry This year, learners will be imminently sitting their GCSEs therefore, learners should have successfully consolidated their Key Stage 4 knowledge of Geometry by year 10 and be successfully working towards their Foundation GCSE curriculum content demands (AO1). For example <ul style="list-style-type: none"> Pythagoras Theorem and trigonometric ratios to find angles and lengths HA - Know the exact values of $\sin \theta$ and $\cos \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ, 60^\circ$ and 90° HA - Know the exact value of $\tan \theta$ for $\theta = 0^\circ, 30^\circ, 45^\circ$ and 60° (AO1), (AO2), (AO3). Calculate surface areas and volumes of shapes
Term 3.1	Topic/s: <ul style="list-style-type: none"> Component 7- Geometry Learners will be able to identify and recall facts about the different 2-D and 3-D shapes. Students will develop the basic understanding of the key areas of geometry.	Topic/s: <ul style="list-style-type: none"> Shape, space and measure Learners will continue to develop their knowledge and skill set for shape, space and measure by looking at more mathematical facts about angles, calculating angles and how to accurately apply them with fluency to different shapes and problems. Students will then begin the basics of coordinates, plans and elevations and scale drawings to prepare them to develop this further in year 9, 10 and 11. (AO1), (AO2), (AO3).	Topic/s: <ul style="list-style-type: none"> Handling data There is many cross curricular links between handling data and science, this will be linked in this are of the curriculum while looking at data and to analyse and compare them. Students will look at averages in more depth by applying them to tables, graphs and charts and comparing averages in a more complicated and analytical manner. Students will then have to figure out the best ways to collect data (frequency tables) and them demonstrate different ways of representing these. Students will begin to	Topic/s: <ul style="list-style-type: none"> Statistics Learners should have successfully consolidated their Key Stage 4 knowledge of Statistics for Year 10 and working towards their Foundation GCSE curriculum content demands (AO1). For example <ul style="list-style-type: none"> Use of and interpreting scatter graphs; recognise correlation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends (AO1), (AO2), (AO3). 	Topic/s: <ul style="list-style-type: none"> Statistics This year, learners will be imminently sitting their GCSEs, therefore, learners should have successfully consolidated their Key Stage 4 knowledge of Statistics by year 10 (AO1). Also be successfully working towards their Foundation and Higher GCSE curriculum content demands. For example extending on areas of the curriculum to include <ul style="list-style-type: none"> Recognising correlation and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and

			look at more complicated 2-way tables and how to complete them. (AO1), (AO2), (AO3).	<ul style="list-style-type: none"> Apply forms of data analysis inferring properties of populations or distributions from a sample, whilst knowing the limitations of sampling. constructing and interpreting diagrams for grouped discrete data and continuous data. 	<p>extrapolate apparent trends (AO1), (AO2), (AO3).</p> <ul style="list-style-type: none"> Appropriate graphical representations, such as box plots and appropriate measures of central tendency, including modal class and quartile/ inter-quartile range(AO1), (AO2), (AO3).
Term 3.2	<p>Topic/s:</p> <ul style="list-style-type: none"> Component 8- Statistics <p>Learners will be introduced to types of data, how to represent basic forms of data, why and how we use statistics. Gaps in students learning will be identified and corrected.</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Handling data <p>Learners will learn how to represent collect and represent discrete data (including grouped) through tables, diagrams and graphs. Students will then learn how to interpret data and begin to compare and analyse the data using averages. Students will finish the year by understanding the probability scale and how to compare likelihood of events and how to express these as fractions and decimals. (AO1), (AO2), (AO3).</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Handling data and probability <p>Students will build upon the introduction to probability by looking at events in a more analytical way to determine best probability, applying them to the 2 way tables. They will apply these by using fractions, decimals and percentages to represent them and determine exclusive and non-exclusive events using 'and' 'or' rules to do this with addition to tree diagrams. Learners will look at theoretical and experimental probability. Lastly, learners will finish by understanding correlation, line of best fit and how to compare two variables using data through scatter graphs. (AO1), (AO2), (AO3).</p>	<p>Topic/s:</p> <ul style="list-style-type: none"> Probability <p>Learners should have successfully consolidated their Key Stage 4 knowledge of Probability for Year 10 and be successfully working towards their Foundation GCSE curriculum content demands(AO1). For those learners with gaps, intervention lessons will be used in support of bridging knowledge.</p> <ul style="list-style-type: none"> Apply the property that the probabilities of an exhaustive set of mutually exclusive events sum to one. Use a probability model to predict the outcomes of future experiments and understand that empirical unbiased samples tend towards theoretical probability distributions, with increasing sample size(AO1), (AO2), (AO3). 	<p>Topic/s:</p> <ul style="list-style-type: none"> Revision <p>Learners will have begun to focus on exam preparation and revision in lesson, both exam technique and targeting key areas of the curriculum based upon exam weight, shadow papers and areas of weakness (AO1) (AO2) (AO3).</p> <p>Assessment: Students will be sitting their GCSE foundation paper exams through AQA, here they will demonstrate the knowledge they have gained and the skills that they have developed. Students will also have the chance to sit their functional skills level 1 and level 2 during this period (AO1) (AO2) (AO3).</p>

Cross curricular links:

Subjects across the school have many different links in content and skills, it is important for staff and students to identify these as it demonstrates the importance of each subject and how they correspond (reason why we learn these skills). With maths the closest link is science, due to the use of formula, equations, collecting, representing and analysing key data from experiments, To be able to access the higher levels and objectives in science it is important that students have the numeracy and mathematic skills to access these. There is many others across each subject at Howard house school, a few of these are:

- Science- Almost every scientific experiment will require one or more of classifying, counting, measuring, calculating, estimating, and recording in tables or graphs. Statistics is used extensively, firstly being taught in maths.
- Humanities- Use of calendar, dates, time, percentages in order to place events in a time to find causes and key events. In geography to collect, represent and interpret data collected and also to use scales, grid references and coordinates.
- PE- Measure distance, times and to use averages to compare athletes and improvements made through training.

Staff will identify the links between maths and other subjects so they are able to work together and ensure students are able to access the curriculum in other areas of the school by providing them with the right knowledge and skill sets by addressing areas of weakness and gaps in learning.