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| **Year 10 – Maths Higher**  |
| **Curriculum intent**  | We believe that students deserve a creative and ambitious mathematics curriculum, rich in skills and knowledge, which ignites curiosity and prepares them well for everyday life and future employment. Our mathematics curriculum will give students the opportunity to:* become fluent in the fundamentals of mathematics, 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.
* reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
* 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 preserving in seeking solutions.
* can communicate, justify, argue and prove using mathematical vocabulary.
* develop their character, including resilience, confidence and independence, so that they contribute positively to the life of the school, their local community and the wider environment.
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| **Term** | **Autumn 1** | **Autumn 2** | **Spring 1** | **Spring 2** | **Summer 1** | **Summer 2** |
| **Knowledge** | * 2 Way Tables
* Frequency Trees
* Rounding and Error intervals
* Estimation
* Use of Calculator
* Product of Primes LCM/HCF
* Real life Multiples
* Fractions
* Ratio
 | * Direct and inverse proportion
* Value for Money
* Exchange Rates
* Recipes
* Percentages
* Interest and Growth
* Depreciation and Decay
* Reverse Percentages
* Index Laws
 | * Expand and Simplify
* Sequences
* Inequalities
* Solving Equations
* Forming and Solving Equations
* Factorising
* Changing the Subject
* Standard Form
 | * Angles in parallel lines
* Interior and Exterior Angles
* Plans and Elevations
* Constructions and Loci
* Bearings
* Pythagoras
* Trigonometry
* Circles
* Arcs and Sectors
 | * Surface area and Volume
* Sampling
* Averages
* Frequency Diagrams
* Scatter Graphs
* Time Series
* Pie Charts
* Coordinate Geometry
* Straight line Graphs
* Non Linear Graphs
 | * Compound Measures
* Real Life Graphs
* Congruence and Similarity
* Transformations
* Vectors
* Probability
* Tree Diagrams
* Venn Diagrams
* Simultaneous Equations
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| **Skills** | * To design and complete 2 way tables to calculate probabilities.
* To design and complete frequency trees to calculate probabilities.
* To be able to round numbers to varying degrees.
* To use inequality notation to specify error intervals.
* To estimate answers to calculations by rounding.
* To use calculators for all calculations involving powers, roots, brackets and negative integers with all 4 operations.
* Find the products of primes using prime factor decomposition and use this to solve LCM/HCF problems.
* Solve problems involving LCM in context i.e time/ number of items.
* To find equivalent fractions and to simplify fractions.
* To solve problems involving fractions and the 4 operations.
* To use/simplify ratios into their simplest form.
* To share amounts by ratios in varying contexts.
 | * To solve problems involving direct and inverse proportionality.
* To be able to calculate proportion using the unitary method.
* To use proportion to solve problems involving best value, recipes and currency conversions.
* To calculate percentages of amounts.
* To convert between fractions, decimals and percentages.
* To use decimals as multipliers to calculate percentages and increases/decreases.
* To be able to infer one number as a percentage of another.
* To use multiples to calculate compound interest/depreciation.
* To make/interpret calculations involving repeated percentage change.
* To find the original amount following an increase/ decrease.
* To understand that anything to the power of 0 equals 1.
* To understand the laws of indices and be able to use these in calculations.
* To understand the role brackets play in calculating with indices.
 | * To be able to simplify algebraic expressions including those involving brackets.
* To be able to find and use the nth term for both linear and quadratic sequences to solve problems.
* To show/construct inequalities on number lines.
* To solve both linear and quadratic inequalities.
* To be able to solve linear equations including when unknowns are on both sides of the equation.
* To be able to form and solve equations in varying contexts including area, perimeter and angles.
* To be able to factorise linear expressions by taking out common factors.
* To be able to factorise quadratic expressions.
* To solve quadratic equations by factorising.
* To be able to change the subject of varying formulae including when powers and roots are involved.
* To convert into and out of standard form.
* To use standard form to calculate problems.
 | * To understand the angle properties of parallel lines to find alternate, corresponding and co interior angles.
* Use geometrical language appropriately and give reasons for angle calculations.
* To be able to calculate interior/exterior angles of regular polygons.
* To use knowledge of triangles to calculate sum of the interior angles of polygons.
* To understand and draw plans and elevations of 3D object.
* Sketch 3D objects when given the plans and elevations.
* To be able to constructs shapes accurately including the use of bisectors.
* To use constructions to solve loci problems.
* To draw/use bearings to calculate problems in different land/sea contexts.
* To understand and use Pythagoras Theorem to solve problems.
* To understand and use trigonometry to find missing angle sizes or lengths in right angled triangles.
* To calculate areas and circumference of circles including arc lengths and sector areas.
 | * To calculate surface areas of various 3d shapes.
* To calculate volumes of various different 3d prisms and pyramids.
* To understand and use different methods of sampling to solve problems.
* To be able to calculate the different averages and interpret these in context.
* To recognise the different advantages and disadvantages of each average.
* To identify different averages/estimates of averages from frequency tables.
* To produce and interpret frequency polygons for grouped data.
* To draw and interpret scatter graphs and to use the line of best fit to solve problems.
* To Construct tables and time series graphs and comment on the trends.
* To construct and interpret pie charts in varying contexts.
* To solve problems involving coordinates in a variety of contexts including Pythagoras and trigonometry.
* To be able to draw, label and scale axis.
* To be able to plot the graphs of linear functions.
* To be able to interpret the graphs of linear functions to solve problems.
* To be able to draw and interpret the functions of non linear functions.
* To calculate roots of quadratic functions.
 | * To know and use the formulae for speed, density and pressure to solve problems.
* To convert between different metric speed measures.
* To interpret information presented in a range of linear and non linear graphs.
* To draw distance time and velocity time graphs.
* To solve angle problems involving congruence.
* Identify scale factors and use these to calculate missing lengths, areas or volumes.
* To complete/descried single or combinations of transformations on a coordinate grid.
* To be able to perform vector arithmetic.
* To be able to calculate resultant vectors from diagrams.
* To be able to use vectors to solve geometric problems involving ratios.
* Know and use that all probability adds up to 1.
* To draw and interpret probability trees and use these diagrams to calculate probabilities.
* To draw/interpret Venn diagrams.
* To be able to use Venn diagram notation to calculate probabilities.
* To be able to solve simultaneous linear equations.
* To be able to solve linear and quadratic simultaneous equations.
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| **Assessments** | * Baseline
* Regular exam practice
 | * Autumn Assessment (exam paper)
* Regular exam practice
 | * Regular exam practice
 | * Spring assessment (exam paper)
* Regular exam practice
 | * Mock exams
* Regular exam practice
 | * Summer assessment (exam paper)
* Regular exam practice
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| **Curiosity** | * Can you put your skills into action? Try solving these HCF/LCM problems: <https://www.transum.org/software/SW/Starter_of_the_day/Students/HCF_LCM.asp?Level=6>
* Put your bounds knowledge to the test. Can you find your bounds: <https://www.transum.org/Maths/Exercise/Bounds.asp>
* Make a set of revision flashcards for each topic you cover in class, include a full wagoll with notes and a practice question ready to use in Year 10 and 11
* Make a how to use your calculator guide! It will come in helpful for future learning
* Try a mini exam paper <https://www.onmaths.com/mock_exams/mini-mock-1-foundation-calculator/>
* How golden are you? Apply the golden ratio to your body measurements to see if you are golden!? <https://nrich.maths.org/7668>
 | * Get baking! The best way to practice weighing skills is to bake. Try this recipe to make cupcakes - <https://www.bbcgoodfood.com/recipes/cupcakes> . Or why not try something more challenging with this doughnut recipe - <https://www.bbcgoodfood.com/recipes/watermelon-doughnuts>
* Explore the current exchange rates for future holiday destinations. Where will you get best value for money?
* How does the recipe change? Here are some online questions to help you - <https://www.transum.org/Maths/Exercise/Ratio/Recipe.asp> . Alternatively, pick a recipe from a cookbook at home and practice changing the measurements based on how many people you would cook for?
* Put your standard form skills to the test with this interactive quiz- <https://nrich.maths.org/14530>
* Research the best credit cards, loans and mortgages that are out there. Where do you get the best deal?
* Back history month
 | * Play around with the fibbonaci sequence and see what yopu can find out <https://nrich.maths.org/11164>
* Healthy eating! A real-life example of substitution is substituting unhealthy foods for healthy alternatives. Why not try and substitute some of your snacks this week for something healthy! Here are some suggestions on the Change4Life website - <https://www.nhs.uk/change4life/food-facts/sugar/sugar-swaps-for-kids#all-swaps>
* Have a go at this interactive activity around rearranging equations. How many levels can you progress through? <https://www.transum.org/software/SW/Starter_of_the_day/Students/Changing_The_Subject.asp?Level=6>
* How good are you at balancing? Can you you’re your balancing skills here <https://www.transum.org/software/SW/Starter_of_the_day/Students/Equations.asp>
 | * Apply your loci skills to exact scale drawings in this goat problem <https://www.transum.org/Software/SW/Starter_of_the_day/starter_March6.ASP>
* What am I looking at? can you identify the various elevations of these shapes? <https://www.transum.org/Maths/Activity/Plans_and_Elevations/>
* Take a walk in your local area. How many circles/parts of circles can you see? Can you name them all?
* Map skills – practice orienteering in the local area. Here is Etherow Lodge parks orienteering course (10 minute walk from school) - https://gmoa.org.uk/borough\_tameside/etherow-lodge-park-orienteering/ .
* When will I ever use Pythagoras again?

Take a trip to this website and find out where it can be used in real life: <https://sciencing.com/use-trigonometry-architecture-6631509.html>* Far Horizon- Test your skills of Pythagoras and trigonometry with this activity from Nrich

<https://nrich.maths.org/2357>Pi Day | * How many crazy averages facts can you find on the internet? Sort them out into the ones you believe are true and the ones you think are made up – here are some to start you off <https://funfactz.com/tags/average/>
* Can you work your way through these surface area problems? How many stages can you pass? <https://www.transum.org/Software/SW/Starter_of_the_day/Students/Surface_Area.asp?Level=8>
* Bee Aware, can you use your knowledge of scatter graphs to put together a project on the demise of bees <https://donsteward.blogspot.com/2013/12/bee-aware.html>
* Battleships! Play a game of battleships with a friend to help you get used to the coordinate grid. Here is an interactive version - <https://www.interactive-maths.com/coordinate-battleship-all-four-quadrants-ggb.html>
* Take a trip to this interactive website to try out your skills of drawing straight line graphs

<https://www.interactive-maths.com/drawing-straight-line-graphs-ggb.html> Maths challenge date TBC | * Try this with a real deck of cards or the online version here

<https://www.funtrivia.com/trivia-quiz/SciTech/Pick-A-Card-Any-Card-269306.html>* Choose a Venn Diagram quiz to complete here <https://www.sporcle.com/games/tags/venndiagram>
* What is your average speed? Practice running the same distance and record your speed each time. Use this video to help you calculate your average speed - <https://tutors.com/math-tutors/geometry-help/average-speed-formula> .
* Test your knowledge of vectors with this interactive activity

<https://www.transum.org/software/SW/Starter_of_the_day/Students/VectorsB.asp> * Look up Vincent Van Gough’s ‘Starry Night Over the Rhone’. Go to a local canal or river and sit and draw a picture of the landscape – can you draw this picture based on what it would look like in the water?
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