Programme of study for **Year 10 Foundation Maths**

Autumn (1st term)	Autumn (2nd term)	Spring (1st term)	Spring (2nd Term)	Summer (1st term)	Summer (2nd term)
Other timescale: From: September To: October	Other timescale: From: October To: December	Other timescale: From: January To: February	Other timescale: From: February To: April	Other timescale: From: April To: May	Other timescale: From: June To: July
Topic / Key Question: - Perimeter, area and volume - Real-life graphs **Skills:** A01: Use, recall and apply standard techniques AO2: From given mathematical information: Reason, interpret & communicate mathematically A03: Solve problems or evaluate methods and solutions within mathematics and in other contexts.	Topic / Key Question: - Straight line graphs - Ratio - Proportion **Skills:** A01: Use, recall and apply standard techniques AO2: From given mathematical information: Reason, interpret & communicate mathematically A03: Solve problems or evaluate methods and solutions within mathematics and in other contexts.	Topic / Key Question: - Probability **Skills:** A01: Use, recall and apply standard techniques AO2: From given mathematical information: Reason, interpret & communicate mathematically A03: Solve problems or evaluate methods and solutions within mathematics and in other contexts.	Topic / Key Question: - Pythagoras and trigonometry - Multiplicative reasoning **Skills:** A01: Use, recall and apply standard techniques AO2: From given mathematical information: Reason, interpret & communicate mathematically A03: Solve problems or evaluate methods and solutions within mathematics and in other contexts.	Topic / Key Question: - Plans and elevations - Constructions, loci and bearings - Quadratic equations: expanding and factorising **Skills:** A01: Use, recall and apply standard techniques AO2: From given mathematical information: Reason, interpret & communicate mathematically A03: Solve problems or evaluate methods and solutions within mathematics and in other contexts.	Topic / Key Question: - Quadratic equations: graphs **Skills:** A01: Use, recall and apply standard techniques AO2: From given mathematical information: Reason, interpret & communicate mathematically A03: Solve problems or evaluate methods and solutions within mathematics and in other contexts.
Key Learning Outcomes: Indicate given values on a scale. Convert between units of measure within one	**Key Learning Outcomes:** Use function machines to find coordinates. Identify, plot and draw	**Key Learning Outcomes:** Distinguish between events which are impossible, unlikely, even chance, likely and	**Key Learning Outcomes:** Understand, recall and use Pythagoras' theorem in 2D. Justifying if a triangle is right-angled or not using	**Key Learning Outcomes:** Draw circles and arcs to a given radius or diameter. Measure & draw lines to nearest mm + angles to	**Key Learning Outcomes:** Generate points and plot graphs of simple quadratic functions, then more general

system. Make sensible estimates of a range of measures in everyday settings. Find perimeter of 2D shapes. Find area of 2D shapes. Find perimeter and area of composite shapes. Estimate surface area by rounding dimensions to 1 significant figure. Find Surface Area (SA) of a prism. Identify and name common 3D shapes. Sketch nets of cuboids and prisms. Find the volume of a prism. Estimate volume of prism, by rounding lengths to 1 significant figures. Function machines. State coordinates in all 4 quadrants in 2D. Identify points from given coordinates.	graphs ***y=a, x=a, y=x, y= -x.*** Plot and draw graphs of straight line: ***y=mx + c.*** Sketch a linear graph using the gradient & y-intercept. Identify parallel lines from given equations. Plot and draw graphs for equation. In form: ***ax + by= c.*** Find the equation of a straight line graph. Find the equation to a line through one point and a given gradient. Find approximate solutions to a linear equation from a graph. Find the gradient of straight lines from real life graphs. Write ratios in their simplest form. Express the division of a quantity into a number	certain to occur. Mark events/probabilities on a probability scale of 0 to 1. Write probability using fractions, percentages or decimals. Find the probability of an event happening using theoretical probability. List all the outcomes for single events, and combined events systematically. Work out probabilities from frequency tables, frequency trees and two way tables. Record outcomes of probability experiments in tables. Add simple probabilities. Identify different mutually exclusive outcomes and know the sum of the probabilities of all outcomes is 1.	Pythagoras' theorem. Calculate the length of the hypotenuse and of a shorter side in a right-angled triangle (including surd and decimal lengths). Apply Pythagoras' theorem with a triangle drawn on a coordinate grid. Calculate the length of a line segment AB given pairs of points. Understand, use and recall the trigonometric ratios sine, cosine and tan; apply them to find angles and lengths of general triangles in 2D figures. Use trigonometric ratios to solve 2D problems including angles of elevation and depression. Know exact values of $\sin\theta$ and $\cos\theta$ for : θ= 30^0, 45^0 ,60^0 and 90^0. For $\tan\theta$ know exact values for : θ= 30^0, 45^0, 60^0	nearest degree. Understand CW & ACW and use compass directions. Draw sketches of 3D solids: Know the terms face, edge, and vertex. Identify and sketch planes of symmetry of 3D solids. Use isometric grids to draw 2D representations of 3D solids. Make accurate drawings of 2D shapes using a ruler + protractor. Draw front & side elevations & plans of shapes made from simple solids. Given the front + side elevations &plan, sketch the 3D solid. Understand congruence. Construct SSS, SAS, ASA & right angled triangles. Construct: perpendicular bisector of line/angle,	quadratic functions. Identify a line of symmetry of a quadratic graph. Find approximate solutions to quadratic equations using a graph. Interpret graphs of quadratic functions from real-life problems. Identify and Interpret roots, intercepts and turning points or quadratic graphs.

Find the coordinates of points identified by geometrical information in 2D. Find the midpoint coordinates of a line segment. Draw straight line graphs for real-life situations. Draw distance/time graphs and velocity/time graphs. Work out time intervals for graph scales. Interpret distance/time graphs. Interpret information presented in a range of linear & non-linear graphs. Interpret graphs with negative values on axes. Interpret gradient as the rate of change in distance/time & speed/time graphs, graphs of containers filling and emptying.	of parts as a ratio. Share a ratio in a given quantity. Interpret a ratio to describe a situation. Use ratio to find 1 quantity when the other is known. Write ratio as a fraction + as a linear function. Write ratio in form 1:m or m:1. Use ratio and be able to: - compare a scale model to real-life object to scale up recipes and convert currencies. Write a ratio as a fraction. Use proportion as equality of ratios. Solve word problems involving direct and indirect proportion. Work out which product is better buy.	Use ***1 – p*** as the probability of an event not occurring, where ***p*** is the probability of the event occurring. Find a missing probability from a list or table, including algebraic terms. Find the probability of an event happening using relative frequency. Estimate the number times of times an event will occur, given the probability and the number of trials (experimental & theoretical). Draw and use a sample space diagrams. Work out the probabilities from Venn diagrams to represent real life situation and also abstract sets of numbers. Compare experimental data & theoretical probability.	Understand and use compound measures: density, pressure & speed. Convert between metric speed measures. Read values in km/h and mph from a speedometer. Use kinematics formulae to calculate speed and acceleration. Express a given number as a percentage of another number. Calculate percentage profit or loss. Make calculations involving repeated and change not using a formula Find the original amount, given the final amount after a percentage increase or decrease. Use compound interest. Use measures in ratio proportion problems: currency, conversion,	perpendicular from a point to a line & angles of 45^0, 90^0 Draw and construct diagrams from given instructions. Use and interpret maps and scale drawings. Make an accurate scale drawing from a diagram. Use 3 figure bearings to specify direction. Mark on a diagram the position of point B, given its bearing from point A. Given the bearing of point A from B, workout the bearing of B from A. Give bearings between the points on a map or a scaled plan. Use accurate drawings to solve bearings problems. Solve locus problems including bearings. Define a quadratic expression. Multiply together two	

	Scale up recipes. Convert between currencies. Solve problem using unitary method. Recognising direct & indirect proportion graphs. Understand direct proportion: ***y = kx.***	Compare relative frequencies from samples of different sizes. Find the probability of success events (Several throw of a single dice). Use tree diagrams to calculate the probability of independent/dependent events.	rates of pay, best value. Set up, solve and interpret the answers in growth and decay problems. Understand and interpret equations/graph that are in direct and indirect proportion. Understand X is inversely proportional y is equivalent to x is proportional to $\frac{1}{y}$.	algebraic expressions with brackets. Square a linear expression **$(x + 1)^2$** Factorise quadratic expressions of the form $\boldsymbol{x^2 + bx + c.}$ Factorise a quadratic expression $\boldsymbol{x^2 - a^2}$ using a difference of two squares. Solve quadratic equations by factorising. Find roots of a quadratic function algebraically.	
End of term 1 assessment to cover: - Perimeter, area and volume - Real-life graphs - Straight line graphs - Ratio - Proportion		End of term 2 assessment to cover: - Probability - Pythagoras and trigonometry - Multiplicative reasoning		End of year assessment to cover: - Plans and elevations - Constructions, loci and bearings - Quadratic equations: expanding and factorising - Quadratic equations: graphs	
Rationale for sequence: In Autumn term 1 learners are exposed to perimeter, area, volume questions and real life graphs. In KS3 learners are	**Rationale for sequence:** Learners must continue to use skills obtained from real life graphs. In KS3 students are familiar with the concept of a ratio. Here learners simplify and	**Rationale for sequence:** **I**n KS3 students are taught to record, describe and analyse the frequency of outcomes of simple probability experiments involving randomness, fairness equally and	**Rationale for sequence:** **I**n spring term 2 students are expected to develop their multiplicative reasoning skills and are expected to recall and retain Pythagoras theorem whilst being introduced	**Rationale for sequence:** **I**n summer term 1 students focus on plans and elevations, constructions, loci and bearings, quadratic equations: expanding and factorising.	**Rationale for sequence:** **I**n the last term of year 10 students discovering more depth of quadratics and its graphs and properties. Learners need to recall

Introduced to finding the area of squares and rectangles. They are also expected to find the area of shapes on a centimetre grid by counting squares. At the same time students should be able to recognise that shapes with the same area have different perimeters and vice versa. From using the formula for an area of: trapezium, triangle and parallelogram, students are able to solve problem solving questions on composite shapes. (2 or more shapes). Prior skills of rounding to decimal places, significant figures will be used when estimating the surface area and volume of 3D shapes. Learners will be taught in the Autumn term 1 to sketch nets of cuboids and prisms at the same time be able to identify and name	divide an amount into a ratio. In Autumn term 1 in KS4 learners are now interpreting a ratio to describe a situation. Students will then be introduced to write a ratio in the form of 1:n or n:1 to find one quantity when the other is unknown. Learners will learn how to express ratio by parts and fractions. Students discover this through real life scaling problems. A real life scenario can be applied when scaling up or down recipes. Linking proportion and ratio with KS3, students have been taught to express and simplify ratio; unitary ratio and divide into ratio; solve problems involving proportion i.e. recipe and exchange rates In KS4 building on their previous knowledge, learners will be able to solve complex problems using the understanding of direct	unequally likely outcomes using the appropriate language and the 0-1 probability scale. They recall and retain that the probability of all outcomes sum to 1. In KS4 students are expected to recall and retain how to draw and use sample space diagrams. They also recall information on how to find a missing probability from a list or table including algebraic terms using their prior algebra skills. Learners this term begin to develop skills on find probabilities using a Venn diagram to represent real life situations and abstract set of numbers. Here they explore how Venn diagrams are used in real life jobs such as scientists studying human health and medicines. Leaners are also introduced to	to new trigonometry content in a right-angled triangle. Learners have previously been exposed to the concept of Pythagoras theorem. In KS4 they have to extend their skills by applying Pythagoras' theorem with a triangle drawn on a coordinate grid, find the hypotenuse and shorter lengths of a triangle from a right angle triangle. They will need to recall skills on leaving answers in surd form and to any correct decimal point, significant figure. Learners will also explore real life aspects of Pythagoras theorem and trigonometry SOH CAH TOA using trigonometric ratios to solve 2D problems including angles or elevation and depression for example pilots when they are landing and flying back to airports.	In KS3 learners previously can measure and draw lines to the nearest mm and angles to the nearest degree. In KS4 learners need to recall these skills by drawing sketches of 3D solids identify and understand what the terms face, edge and vertex mean. This term learners will be introduced to drawing front and side elevations and plans of shapes made from simple solids (recall from previous skills obtained) and give the front and side elevations and plans and sketch these 3D solids. Here learners discover the importance of plans and elevations to real life jobs in mechanical engineering, architects when constructing initial building plans. Leaners have previously been introduced to construction and loci and bearings. In KS4 learners understand the importance of	skills obtained from the summer term 1 on quadratic graphs and develop skills on its properties this term. Previously students learnt how to factorise quadratic equations where the coefficient of x^2 is 1, then place these into brackets and can begin to solve for x. Students are exposed to new vocabulary such as estimates and roots (where it meets the x axis). This term students are required to generate points and plot graphs of simple quadratic functions and more complex quadratics using a table of values. Here students will need to recall and recap skills on algebra previously obtained on substitution and need to be careful when substituting negative values into squares ensuring brackets are used to avoid common calculator mistakes.

common 3D shapes.	and inverse proportions. Most of the other concepts that requires multiplicative reasoning. Furthermore, students need to express a multiplicative relationship between two quantities as a ratio or a fraction and show this on a graph. The equation of a straight-line can been as a relation between two quantities and the table representation is closely related to proportions. The concept of proportion and ratio relies on multiplicative reasoning, which appears in most mathematical contexts. From recipe and exchange rates, from graphs to interpreting the gradient at a point on a curve as the instantaneous rate of change, from Pythagoras to trigonometry, from scaling a length to find the relative area and	calculating the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions.	In KS3 learners have previously worked with percentage multipliers (increase and decrease.) In KS4 they need to recall and retain information and understand the language of a question for depreciation (loses value) interest/appreciation and apply skills retained on percentage multipliers to compound interest questions. Here students explore real life applications of compound interest (I.e. interest gained from a saving account after a number of years.) Students will explore field of real life jobs such as finance when being introduced to this topic. In KS4 learners are also revisiting skills obtained from previous terms on real lie graphs by using ratio and proportion problems: currency conversions, rates of pay and best value. Leaners will also set up	congruency and recall skills on constructing SSS, SAS, ASA and right angles triangles using a ruler compass and protractor. Learners are expected to use loci by drawing and constructing diagrams from given instructions and is introduced to skills on constructing perpendicular bisectors of a line. Learners explore how important bearing and loci are for architects, pilots and jobs, which involve a boat sailing i.e. fisherman. This term students are introduced to what a quadratic equation and explore the general form of a quadratic is ax^2+ bx+c where a, b and c are integers. Previously in KS3 students can expand single brackets and move onto expanding double brackets in KS4 and simplify answers in it's simplest form by collecting like terms. Learners are also	Students this term also deepen their understanding on properties of quadratics graphs by identifying a line of symmetry on a quadratic graph, interpret and identify roots, intercepts and turning points. Students will explore real life jobs where quadratic graphs are used i.e. astronomers, physicists and economists.

	volume of a given 3D shape.		and solve and interpret problems involving growth and decay using prior skills from graph work.	introduced to difference of two squares a type of quadratic and how to factorise these. Learners in this term explore how to factorise quadratics where the coefficient of x^2 is 1 and then can apply these to problem solving skills involving composite shapes.	
Reading / literacy: Key words/ problem solving questions/ retention and recall and promoting cultural capital					
Numeracy: Assessed throughout the lesson					
Enrichment / opportunities to develop cultural capital (including careers, WRL and SMSC): In maths lessons: **Spiritual** growth is encouraged by students reflecting on their answers, reasoning and in class discussions Learners are made aware of choices they make may results to different outcomes and consequences. Their **Moral** duty is to be able to make the right choices in terms of behaviour and to reach the correct answers/conclusions Leaners **Social** developments is encouraged through discussions, sharing ideas, peer marking, articulating their thinking and group work Leaners are exposed to different topics and their links to different **Culture** throughout the curriculum. This includes different multiplication methods from Egypt, Russia and China, Pythagoras' Theorem from Greece, algebra from the Middle East and debates as to where Trigonometry was first used. We try to develop an awareness of both the history of maths alongside the realisation that many topics we still learn today have travelled across the world and are used international					