

Subject: Mathematics

	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
6	Content Place Value Four Operations	Content Fractions Converting Units	Content Ratio, Algebra & Decimals	Content FDP Area, Perimeter & Volume Statistics	Content Shape Position & Direction	Content Themed Projects, Consolidation & Problem Solving
	Skill Development <ul style="list-style-type: none"> Numbers to 10,000,000 Powers of ten Compare and order integers Add/subtract integers Common factors & multiples Primes to 100 Square & cube numbers Multiply up to 4 digit by 2 digit Short/long division Order of operations 	Skill Development <ul style="list-style-type: none"> Equivalent fractions, simplifying Comparing & ordering (both num & denom) Add/subtract simple fractions, inc mixed numbers Multiply fraction by integer, then fraction (same with dividing). Fractions of amount, finding the whole Metric & imperial conversions 	Skill Development <ul style="list-style-type: none"> Introduction to ratio symbol Scale drawing & scale factors Similar shapes Ratio problems Proportion & recipes 1 & 2 step function machines Form expressions Substitution Solve 1 & 2 step equations Rounding, adding & subtracting decimals Multiply & divide by 10/100/1000 	Skill Development <ul style="list-style-type: none"> Decimal/fraction equivalence Equivalent FDP Ordering FDP Percentage of an amount Percentages – missing values Area of triangle (all) Area of parallelogram Volume of a cuboid Line graphs Dual bar charts Pie charts (inc w/ %) Finding the mean 	Skill Development <ul style="list-style-type: none"> Circles – labelling radius/diameter & finding Nets of 3D shapes Read & plot in 4 quadrants Solve problems with co-ordinates Translations & Reflections 	Skill Development <p>Develop the range of skills learnt during KS2 and apply them to a range of different contexts. e.g. Bakery Task – ratio, profit, percentages etc, Planning a Tour – costs, conversions, time.</p> <p>White Rose Futures – careers linked, jobs, percentages, wages etc.</p>
7	Content Addition and subtraction Place value <i>Why is $a+b$ the same as $b+a$? Why is $a-b$ not the same as $b-a$? What do we mean by a significant figure?</i>	Content Multiplication and division Negative numbers <i>What is the commutative law for multiplication? Why does $ab=ba$? Which quantities in real life use negative numbers? Why do some quantities not allow negative values?</i>	Content Developing number sense Fractions <i>Is 1 prime? What are factors and how do we find them? How many ways can you convince me that $8/9$ is larger than $7/8$?</i>	Content Ratio/Proportion Percentages <i>What is a ratio, where might I see it in use in real-life? What do we mean by the word “percent”?</i>	Content Discrete Data Intro to algebra – algebraic notation, simplifying, equality <i>How many ways can you represent the same data? What do the different measures of average tell us about a set of data? How is algebra linked to prior knowledge of adding & multiplying numbers?</i>	Content Review & Consolidation of “big questions”
	Skill development <ul style="list-style-type: none"> Use a variety of mental & written strategies to explore addition/subtraction - including with negatives & decimals. Applications of addition/subtraction - perimeter, angle facts, sequences, two-way tables & money problems. Order/compare integers and decimals. Round numbers to an appropriate degree of accuracy (dp, sf). Common metric conversions Applications of place value – finding midpoint of two numbers, median 	Skill development <ul style="list-style-type: none"> Use a variety of mental & written strategies to explore multiplication/division - including negatives & decimals. Multiplying/dividing by powers of ten. Understanding the effect of multiplying/dividing by numbers less than 1. Applications of multiplication/division - area, surface area & volume of cuboids, mean, money problems Negative numbers in context & on a number line. Ordering positives & negatives. Using the four operations involving negative numbers. Perform calculations which cross “zero”. 	Skill development <ul style="list-style-type: none"> Extend mental calculations to squares/cubes & associated roots. Recognise & identify prime numbers, calculate a number as a product of its prime factors. Addition/subtraction laws with indices. Order of operations – with the four operations and exponents. Fractions – concept of a fraction, proper/improper fractions. Ordering, simplifying and finding equivalent fractions. Extend knowledge of the four operations to include fractions. Find fractions of amounts. Applications – worded fraction problems, pie charts, order of operations with fractions 	Skill development <ul style="list-style-type: none"> Writing ratios, simplify ratios. Use the unitary method to solve problems. Direct & inverse proportion problems (non-algebraic). Applications – find best value for money, scale up/down recipes, simple enlargements. Introduction to %’s. Equivalence of FDP, techniques to convert, ordering FDP. Write one quantity as a % of another. Find % of amounts (non-calc and calc), deal with %’s greater than 100. Applications – use % to make comparisons between quantities. Area/perimeter problems involving %’s. Money problems involving %’s. 	Skill development <ul style="list-style-type: none"> Understand & use frequency tables. Draw & interpret graphs – bar charts/pictograms/stem & leaf. Find mean, median & mode from lists of data and frequency tables (not grouped). Understand spread – range/IQR - find from lists of data. Be able to identify outliers from lists of data. Use and understand basic algebraic notation. Solve simple unknown problems (symbols, blank boxes, letters etc). Simplify expressions by collecting like terms. Write basic algebraic expressions. Understand equality/balancing of algebraic expressions. Solve one & two step equations. Applications – angle facts, perimeter of basic shapes. 	Skill development <ul style="list-style-type: none"> Review of all Y7 content to prepare for EOY exam, as directed by in class assessments, teacher assessment. Post exam review of key content to allow movement onto Y8 pathway.

		<p>€ Applications – sequences, money problems involving “debits”</p>				
	<p>Assessment Regular diagnostic class assessments</p>	<p>Assessment Regular diagnostic class assessments 1x Milestone Assessment</p>	<p>Assessment Regular diagnostic class assessments</p>	<p>Assessment Regular diagnostic class assessments 1x Milestone Assessment</p>	<p>Assessment Regular diagnostic class assessments</p>	<p>Assessment Regular diagnostic class assessments End of Year assessment</p>
8	<p>Content Algebraic notation/manipulating terms Proportional Reasoning</p> <p>What does substitute mean mathematically? What is meant by a multiplier? How does this differ if increasing or decreasing a %?</p>	<p>Content Simplifying expressions Ratio</p> <p>What is the difference between expansion & factorisation? What does expand $2(x+1)$ mean? Where might we see ratio in real-life?</p>	<p>Content Equality 2 Geometry in the cartesian plane.</p> <p>What do we mean by equality? What is the difference between equivalence & equality? What does the gradient of a line represent?</p>	<p>Content Inequalities Formulae</p> <p>How many ways can you represent an inequality? How do the order of operations link to substitution into formulae? What is the difference between an expression, equation & formula?</p>	<p>Content Constructions & Loci Circles</p> <p>What do the words perpendicular/bisect and locus mean? What do the words tangent/chord mean? What is the relationship between pi and the area/circumference of a circle?</p>	<p>Content Review and consolidation of “big” questions</p>
	<p>Skill development</p> <p>€ Manipulating algebraic terms – review of directed numbers, substitute values into algebraic expressions (inc negatives/decimals), generate terms and extend basic sequences from algebraic notation</p> <p>€ Prop Reasoning - % increase and decrease, % change, repeated % change by different amounts (e.g. total % change when increase of 10% followed by increase of 5%), simple interest</p>	<p>Skill development</p> <ul style="list-style-type: none"> • Simplifying Expressions – expand single brackets, expand two or more single brackets & simplify. Factorise algebraic expressions into single brackets. Expand double brackets. Write more complex algebraic expressions. • Applications - Form and simplify an algebraic expression for the perimeter and area of shapes, inc compound shapes. • Divide in a given ratio, write ratios in the form 1:n and n:1. Solve ratio problems when one quantity is known, difference is known etc. Direct/inverse proportion worded problems. Worded problems involving ratio. 	<p>Skill development</p> <ul style="list-style-type: none"> • Equality II – solve two step equations involving brackets, solve equations with unknowns on both sides, solve equations with fractions in the denominator. • Applications – form and solve equations in geometric contexts. • Geometry in the cartesian plane – read/write co-ordinates, identify horizontal/vertical lines ($y=a$, $x=a$, $y=x$), introduction to $y=mx+c$, find grad/int from graphs and from expressions in form $y=mx+c$ 	<p>Skill development</p> <ul style="list-style-type: none"> • Inequalities – compare values using $<$, $>$ etc. Write down integer values that satisfy a given inequality, write inequalities. Solve simple linear inequalities in one variable and represent the solution on a number line. • Formulae – write basic formulae, evaluate expressions/formulae by substitution, rearrange basic linear formulae. • Applications – find and use nth term of arithmetic sequences 	<p>Skill development</p> <ul style="list-style-type: none"> • Constructions/Loci - Use compass to draw circles & arcs. Construct an equilateral triangle, construct angles of 30, 45 and 90 degrees. Construct a perpendicular bisector, angle bisector. Solve simple loci problems, - fixed distance from a point, fixed distance from a line, equidistant from two points. • Circles – circle parts & properties, circumference of a circle, area of a circle, problems with area & circumference. Find areas and circumference in terms of pi. 	<p>Skill development</p> <ul style="list-style-type: none"> • Review of all Y8 content to prepare for EOY exam, as directed by in class assessments, teacher assessment. • Post exam review of key content to allow movement onto Y9 pathway.
	<p>Assessment Regular diagnostic class assessments</p>	<p>Assessment Regular diagnostic class assessments 1x Milestone Assessment</p>	<p>Assessment Regular diagnostic class assessments</p>	<p>Assessment Regular diagnostic class assessments 1x Milestone Assessment</p>	<p>Assessment Regular diagnostic class assessments</p>	<p>Assessment Regular diagnostic class assessments End of Year assessment</p>
9	<p>Content: Number – Indices/Std Form Where do we use Standard Form in real life? Algebra – Equality III What is the difference between a linear and quadratic equation?</p>	<p>Content: Ratio & Proportional Reasoning What do we mean by direct/inverse proportion? Place Value - Estimation/Use of a calculator When can estimating answers be helpful in real-life?</p>	<p>Content: Probability Do the probabilities of events happening always sum to 1? Where do we see probabilities used in real-life? Angles & Congruence/Similarity How do we find the angle sum of any polygon?</p>	<p>Content: Interpreting Data Why do different averages provide a different perspective on the same set of data? What does the correlation tell us about two variables? Pythagoras & Trigonometry</p>	<p>Content: Percentages/Compound Measures Are there any situations where percentages can exceed 100%? What is meant by the term compound interest? Constructions & shape Why is it useful to be able to see 3D shapes from different perspectives?</p>	<p>Content: Review & Consolidation Young money module (time dependent) Will I be a saver or a spender?</p>

	Why do we always make quadratics equal to zero?			How can I tell when to use pythagoras or trigonometry in right angle triangles?		
	Skill development: <ul style="list-style-type: none"> Number – Index laws power of a power, negative powers. Standard form – understand std form notation. Writing small/large numbers in std form or as ordinary numbers from std form notation. Using the four ops with std form. Algebra – solve equations with fractional co-efficients, with unknowns on both sides involving fractions & brackets. Solve simultaneous equations. Expand & factorise basic quadratics. Plot graphs of simple quadratic functions. Plot and solve basic quadratics by factorising. 	Skill development: <ul style="list-style-type: none"> Ratio & Prop Reasoning – Combine two or more ratios. Solve proportional reasoning problems involving currency/exchange rates. Direct/inverse proportion graphs – solve basic linear algebraic problems (no squares/cubes etc). Estimation – review of rounding to sf. Estimate answers; check calculations using approximation and estimation. Error intervals for rounded numbers, truncation. 	Skill development: <ul style="list-style-type: none"> Probability – systematic listing outcomes, Record, describe and analyse the frequency of outcomes of simple probability experiments, introduce language of probability. Sum of all probabilities of mutually exclusive events = 1. Record outcomes & probabilities using frequency trees, simple Venn diagrams, tree diagrams. Angles – angles in parallel lines, interior & exterior angles of polygons. Understand relationships which lead to congruence. Prove shapes are similar – finding scale factors & writing equivalent sides. Transformations – reflections, rotations, symmetry. 	Skill development: <ul style="list-style-type: none"> Interpreting Data - Draw and interpret graphs/charts - frequency polygons, line graphs, real life graphs such as distance-time, velocity-time graphs. Draw a scatter graph, interpret relationships and correlation from scatter graphs. Draw a line of best fit. Pythag & Trig – Pythagoras' Theorem in 2D to find missing sides, prove a triangle is right angled using Pythagoras'. Use pythag to find the distance between two points. Use trigonometric ratios to find missing sides and angles in right angled triangles. Understand bearings and apply this knowledge to solve pythag/trig problems. 	Skill development: <ul style="list-style-type: none"> Percentages – reverse % problems, compound interest and growth & decay problems. Use proportional reasoning to understand the relationships between compound unit measures - Density/Pressure/Speed. Be able to solve problems involving these compound measures. Constructions/Shape - 2D representations of 3D shapes, constructing and interpreting nets, plans and elevations. 	Skill development: <ul style="list-style-type: none"> Your Money Matters has been designed for use with young people age 14 – 16 in England and covers topics including spending and saving, borrowing, debt, insurance, student finance & future planning.
	Assessment Regular diagnostic class assessments	Assessment Regular diagnostic class assessments 1x Milestone Assessment	Assessment Regular diagnostic class assessments	Assessment Regular diagnostic class assessments 1x Milestone Assessment	Assessment Regular diagnostic class assessments	Assessment Regular diagnostic class assessments End of Year assessment
10	Content: Indices, <i>Surds</i> & Standard Form Direct & <i>Indirect</i> Proportion	Content: Fractions <i>incorporating algebra</i> <i>Algebraic Proof</i> Percentages Growth & Decay <i>Iterative Processes</i> <i>Functions</i>	Content: Probability <i>Capture/Recapture</i> Congruence, <i>Proof</i> & Transformations Circle Theorems	Content: Quadratics Completing the Square Sequences Inequalities Simultaneous Equations <i>Vectors</i>	Content: Bearings & Constructions Loci Pythagoras Trigonometry	Content: Area, Volume & Similarity Compound Measures Graph Sketching <i>Transformation of Graphs</i>
	Skill development - extend use of rules for indices to include negative and <i>fractional</i> powers. -solve equations where unknown is a power. -Solve real life problems expressed in Standard Form. -Rationalise the denominator of a fraction expressed using surds. -Solve problems using direct and <i>indirect</i> proportion expressed algebraically.	Skill development: -be able to apply the four rules of fractions expressed algebraically. -Prove mathematical statements using algebra -be able to solve problems using decimal multipliers to a variety of percentage problems including compound rates of growth and reverse percentages. -Find an unknown rate of compound interest using algebraic techniques. -Solve problems using growth and decay. -Understand notation used for iterative processes, rearrange formulae to apply an iterative process and find solutions to a given degree of accuracy.	Skill development: -Use Venn Diagrams and Probability Trees to calculate the probability of more than one event. -Calculate outcomes for conditional probability problems using Venn Diagrams, Probability Trees, The And & Or rules. -Solve probability problems expressed algebraically. -Solve problems using the Capture/Recapture method. -Identify congruent shapes and produce a written proof to show that two triangles are congruent. -Be able to draw and identify the four transformations including enlargements with a negative scale factor. -Know and use Circle Theorems to solve problems.	Skill development: -Solve quadratic equations including those requiring the use of the quadratic formula, presented in context. -Be able to manipulate quadratic expressions in CTS form where the coefficient of x^2 is greater than one. -Find nth term rule for a quadratic sequence. -Identify and solve problems using geometric sequences. -Solve quadratic inequalities. -Set up and solve simultaneous equations presented in a variety of contexts. -Solve simultaneous equations including examples where one equation is quadratic. - Solve problems and derive proofs using vectors -	Skill development: -Be able to draw and solve problems using bearings. -Be able to use pencil, straightedge and compass to construct bisectors and perpendiculars. -Draw the loci of a given point and solve problems using loci in context. -Use Pythagoras & trigonometry to solve problems using bearings. -Solve multi-step problems using SOHCAHTOA and Pythagoras. -Know and use the sine rule, cosine rule and area sine rule in context.	Skill development: -Solve problems expressed in context, including algebraically, using known formulae for area and volume. -Find area of a segment using the area sine rule. -Solve problems using similar shapes using length, area and volume. -Calculate compound measures speed, density & pressure. -Interpret limits of accuracy. - Sketch graphs to model real life situations including modelling compound measures. -Transform graphs, including those expressed using function notation, using reflections and translations.

		-Use function notation appropriately, find composite and inverse functions.				
	Assessment Regular diagnostic class assessments	Assessment Regular diagnostic class assessments 1x Milestone Assessment	Assessment Regular diagnostic class assessments	Assessment Regular diagnostic class assessments 1x Milestone Assessment	Assessment Regular diagnostic class assessments	Assessment Regular diagnostic class assessments End of Year assessment
11	Revise: Number Fractions, Decimals & Percentages	Revise: Ratio and Proportion Algebra Linear Graphs	Revise: Quadratics Quadratic Graphs Statistics Probability	Revise: Measures Angles Pythagoras & Trigonometry	Revise: Transformations Visualising & Drawing 2D & 3D Shapes	GCSE Examination
	Skill development: -Solve exam style questions that include calculating wages, basic best buy problems and multi-step calculations. -Be able to identify outliers in data sets and give reasons for their exception. -Understand and explain the dangers of extrapolating data. -Be able to compare and contrast two data sets using measures of average and spread including the interquartile range.	Skill development: -Explain why fractions, decimals and percentages are not equivalent. -Solve multi-step problems using a mix of fractions, decimals, percentages and ratio. -Solve real life exam questions using profit & loss, finance offers, BOGOF's and income tax calculations. -Combine ratio	Skill development: -Set up and solve exam questions by choosing to use algebra and/or linear graphs appropriately and efficiently. -Know and then use the equation of a circle to find the equations of tangents and radii. -Simplify and calculate using algebraic fractions. -Use algebraic proof to deduce if a statement is true or false.	Skill development: -Select the appropriate mathematical formulae to solve extended problems using perimeter, area and volume. -Work out the cost of a project using area or volume. -Calculate rates of flow using volume. -Find values of missing angles in regular polygons solely expressed in diagrammatic form. -Select the correct method to solve real life problems using Pythagoras and Trig including those in three dimensions. -Solve multi-step exam questions using a combination of the sine and cosine rules.	Skill development: -Identify and accurately describe the transformation of a shape given the shape and its image after multiple transformations. -Be able to sketch and accurately draw 2D plans & elevations of 3D shapes and vice versa.	Skill development
	Assessment	Assessment Mock Exam x 3 papers	Assessment	Assessment Mock Exam x 3 papers	Assessment	Assessment
12	Content Algebraic Manipulation Quadratic & Simultaneous Equations Understanding of Graphs Coordinate Geometry	Content Binomial Expansions Differentiation	Content Integration Trigonometry	Content Vectors Proof	Content Exponentials & Logs Statistical distributions & Hypothesis Testing	Content Kinematics in one dimension Newton's Laws of Motion
	Skill development Use algebraic long division, factor theorem and other methods to manipulate polynomials algebraically. Work with quadratic functions & their graphs; the discriminant - conditions for roots Understand & use the coordinate geometry of the circle - finding its radius and centre. Understand the effect of simple transformations on the graph of $y=f(x)$	Skill development Understand and use the binomial expansion of $(a+bx)^n$ for positive integer n Use differentiation from first principles. Differentiate x^n for rational values of n. Apply differentiation to find gradients, tangents & normals, maxima and minima and stationary points. Understand and use the 2nd derivative as the rate of change of the gradient.	Skill development Know and use the Fundamental Theorem of Calculus. Integrate x^n Evaluate definite integrals; use a definite integral to find the area under a curve. Understand and use the sine, cosine & tangent functions; their graphs, symmetries & periodicity Work with radian measure Learn and use some basic trig identities to solve simple trigonometric equations in a given interval.	Skill development Calculate the magnitude and direction of a vector. Understand and use position vectors; calculate the distance between two points. Use vectors to solve problems in pure mathematics and in context. Use methods of proof, including by deduction & exhaustion. Disproof by counterexample.	Skill development Know and use the function ax and its graph, where a is positive Know and use the function ex and its graph Understand and use the laws of logarithms Solve equations of the form $ax=b$ Understand and use simple, discrete probability distributions (calculation of mean and variance of discrete random variables is excluded), including the binomial distribution, as a model; calculate probabilities using the binomial distribution Conduct a statistical hypothesis test for the proportion in the binomial distribution and interpret the results in context	Skill development Understand and use the language of kinematics: position; displacement; distance travelled; velocity; speed; acceleration Understand, use and interpret graphs in kinematics for motion in a straight line Understand, use and derive the formulae for constant acceleration for motion in a straight line Use calculus in kinematics for motion in a straight line: Understand the concept of a force; understand and use Newton's first law Understand and use Newton's second law for motion in a straight line Understand and use Newton's third law
	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment

13	<p>Content Further Differentiation Trigonometry & Circular Measure</p>	<p>Content Partial Fractions & Further Integration Further binomial expansion, sequences & series</p>	<p>Content Functions & Transformations Numerical Methods Parametric Equations</p>	<p>Content Differential Equations & Modelling Further Probability Statistical Distributions & Hypothesis Testing</p>	<p>Content Kinematics in 2 dimensions Projectiles Moments</p>	<p>Content Revision & Exams</p>
	<p>Skill development The second derivative and its connection to convex and concave sections of curves and points of inflection Differentiate using the product rule, the quotient rule and the chain rule, including problems involving connected rates of change and inverse functions Understand and use the definitions of secant, cosecant and cotangent and of arcsin, arccos and arctan Understand and use $\sec 2\theta = 1 + \tan 2\theta$ and $\operatorname{cosec} 2\theta = 1 + \cot 2\theta$ Understand and use double angle formulae Construct proofs involving trigonometric functions and identities</p>	<p>Skill development Decompose rational functions into partial fractions Integrate using partial fractions Carry out simple cases of integration by substitution and integration by parts Use a definite integral to find the area between two curves Understand and work with arithmetic sequences and series, including the formulae for nth term and the sum to n terms Understand and work with geometric sequences and series including the formulae for the nth term and the sum of a finite geometric series; the sum to infinity of a convergent geometric series, including the use of $r < 1$; modulus notation</p>	<p>Skill development Find the modulus of a linear function Understand and use composite functions; inverse functions and their graphs Solve equations approximately using simple iterative methods; be able to draw associated cobweb and staircase diagrams Understand and use numerical integration of functions, including the use of the trapezium rule Understand and use the parametric equations of curves and conversion between Cartesian and parametric forms Differentiate simple functions and relations defined implicitly or parametrically Integrate simple functions parametrically</p>	<p>Skill development Differentiate simple functions and relations defined implicitly Construct simple differential equations in pure mathematics and in context Evaluate the analytical solution of simple first order differential equations with separable variables, including finding particular solutions Understand and use conditional probability, including the use of tree diagrams, Venn diagrams, two-way tables Understand and use the Normal distribution as a model; find probabilities using the Normal distribution Conduct a statistical hypothesis test for the mean of a Normal distribution with known, given or assumed variance</p>	<p>Skill development Use vectors to solve problems in kinematics Understand, use and derive the formulae for constant acceleration for motion in 2 dimensions using vectors Model motion under gravity in a vertical plane using vectors; projectiles Understand and use addition of forces; resultant forces; dynamics for motion in a plane# Understand and use the $F \leq \mu R$ model for friction Understand and use moments in simple static contexts</p>	<p>Skill development</p>
	Assessment	Assessment	Assessment	Assessment	Assessment	Assessment