

Mathematics Curriculum

David Nieper
ACADEMY

ASPIRE – ENDEAVOUR - SUCCEED

Purpose and aims

Mathematics is a creative and highly interconnected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about

The national curriculum for mathematics aims to ensure that all students:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that students develop conceptual understanding and the ability to recall and apply knowledge rapidly and
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations & 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 persevering in seeking solutions

Studying Mathematics is important as it teaches students to think critically, analyse information, make informed decisions, communicate clearly and solve problems. Mathematics is by nature a challenging subject as there are always new problems to solve and multiple ways to reach a solution. By studying Mathematics, students develop resilience as they learn to find new ways to solve problems, make & learn from mistakes and constantly explore new ideas and concepts.

As well as meeting the National Curriculum for Mathematics and the requirement to study GCSE Mathematics, students will also study GCSE Statistics. Statistics are used in all industries and influence all aspects of everyday life so we aim to ensure students have the ability to analyse and interpret data in order to draw conclusions and make decisions. In year 11, our most able students also have the opportunity to study Level 2 Further Maths to provide further stretch and provide a strong foundation in preparation for studying Maths at A-Level.

In years 7-11, students follow a Spiral Mathematics curriculum allowing students to meet topics multiple times, with increasing complexity each time. This Spiral Curriculum will cover the subject content requirements of:

- KS3 National Curriculum for Mathematics
- AQA GCSE Mathematics
- AQA GCSE Statistics

Teaching for Mastery

We use the Teaching for Mastery approach within our Mathematics curriculum and lessons as students' chances of success are maximised if they develop deep and lasting understanding of mathematical procedures and concepts. Teaching for Mastery rejects the idea that some students "just can't do maths" and all students are encouraged by the belief that by working hard at mathematics they can succeed and that making mistakes is to be seen not as a failure but as a valuable opportunity for new learning. Lessons are designed to have a high-level of teacher-student and student-student interaction where all students in the class are thinking about, working on and discussing the same mathematical content whilst still providing challenge and the opportunity to deepen understanding. We aim to ensure learning is embedded, deep, connected and fluent by developing a curriculum that includes the Teaching for Mastery principles of coherence, fluency, variation, rerepresentation & structure and mathematical thinking.

Real Life Applications of Mathematics & Statistics

Mathematics & Statistics have many applications in other subject areas, in careers and in real-life and our curriculum uses these examples to enable students to make links and develop an understanding of why we learn Mathematics. As well as teaching mathematical skills, our lessons are designed to include examples of how maths & statistics are used in other subject areas across the Academy as well as within different industries and aspects of everyday life. Students are taught to use mathematics creatively to solve problems and explore multiple representations and methods within maths lessons. Functional Projects are also used to develop students' understanding of Mathematics in real life situations & allow students to further develop their reasoning and Problem Solving skills.

Procedural knowledge

Mathematics is an interconnected subject in which students need to be able to move fluently between representations of mathematical ideas. The programme of study is organised into apparently distinct topics, but students should be taught to make links between topics and form connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

Through the mathematics content, students should be taught to:

Develop fluency

- consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, fractions, powers and roots
- recall and use notation, terminology, facts and definitions; perform routine procedures, including some multi-step procedures
- interpret and communicate basic information
- select and use appropriate calculation strategies to solve increasingly complex problems
- use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships
- substitute values in expressions, rearrange and simplify expressions, and solve equations
- move freely between different numerical, algebraic, graphical and diagrammatic representations [for example, equivalent fractions, fractions and decimals, and equations and graphs]
- develop algebraic and graphical fluency, including understanding linear and simple quadratic functions
- use language and properties precisely to analyse numbers, algebraic expressions, 2-D and 3-D shapes, probability and

Reason mathematically

- interpret and communicate information effectively
- construct chains of reasoning, including arguments
- make deductions, inferences and draw conclusions
- extend their understanding of the number system; make connections between number relationships, and their algebraic and graphical representations
- extend and formalise their knowledge of ratio and proportion in working with measures and geometry, and in formulating proportional relations algebraically
- identify variables and express relations between variables algebraically and graphically
- make and test conjectures about patterns and relationships; look for proofs or counterexamples
- begin to reason deductively in geometry, number and algebra, including using geometrical constructions
- interpret when the structure of a numerical problem requires additive, multiplicative or proportional reasoning
- explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally.

Solve problems

- develop their mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems
- develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics
- begin to model situations mathematically and express the results using a range of formal mathematical representations
- select appropriate concepts, methods and techniques to apply to unfamiliar and nonroutine problems.
- generate efficient strategies to solve complex mathematical and non-mathematical problems by translating them into a series of mathematical processes
- make and use connections, which may not be immediately obvious, between different parts of mathematics
- interpret results in the context of the given problem
- critically evaluate methods, arguments, results and the assumptions made

Curriculum Links to Careers

Mathematics in itself is an employability skill as it teaches students to think critically, analyse information, make informed decisions, communicate clearly and solve problems.

Reasoning and Problem Solving in maths prepares students for careers as they learn to interpret and communicate information effectively, form chains of reasoning using evidence to make informed decisions and to model situations mathematically to solve real life problems.

Much of the subject content also has multiple real-life applications & career links which will be highlighted and used in teaching wherever possible. The following examples of subject links to careers can be found throughout the mathematics curriculum:

NUMBER

- * Calculations used in various different industries and careers settings
- * Budgeting, bank statements and financial calculations
- * Negative numbers are presented in real life situations, such as with changes in temperature.
- * LCM & HCF are used in various real-life situations, such as astrology and systems, such as transportation and electrics
- * Rounding allows students to carry out estimation of real-life amounts, such as earnings, taxes and shopping costs.

FDPRP

- * Percentages of amounts are calculated in contexts of sales, retail and other industries
- * Profit and loss is described as percentage change
- * Compound Interest, Depreciation and the use of percentages in other financial measures are calculated and used
- * Using proportional reasoning to solve functional problems set in careers based and other real life situations
- * Calculating speed, distance and time to solve problems

ALGEBRA

- * Formulae are used to represent real-life situations – including learning how formulae are used in various work settings for example, to work out payments or calculate quantities of materials needed (e.g., a builder working out number of bricks).
- * Common scientific formulae seen both in the science curriculum and in real life/careers based contexts are used throughout the maths curriculum.
- * Constructing & solving equations (linear & quadratic) to solve a variety of real life and functional problems
- * Exploring sequences found in nature and other real life situations to recognise patterns and predict results
- * Modelling situations graphically and algebraically, including conversions of currency, wages and tariffs

GEOMETRY & MEASURES

- * Metric and imperial units of measure, and the appropriate use for different units and measuring items using a variety of real life and careers based contexts e.g., weight of a ball, distance to London etc.
- * Conversions on real-life measurements, such as distances and weights of common items
- * Map scales, position and bearings are taught in the context of navigation
- * Use of accurate measurements, including angles, constructions & Loci in construction & design
- * Area, Perimeter and Volume are used to tackle real-life problems such as cost of re-painting or papering, garden design and upholstery.
- * Properties of shapes, and angles, including tessellations, and use manipulatives to create tiling designs and brick arrangements.
- * Pythagoras and Trigonometry are presented in real life situations including in the construction industry, in crime scene investigation & navigation

STATISTICS & PROBABILITY

- * Statistics and Probability topics are linked to real life contexts and wherever possible using relevant and "real life" data (eg. COVID-19 data)
- * Planning and carrying out statistical investigations to make decisions set in careers based contexts
- * Data analysis and presentation of data is explored and linked to how businesses and governments make decisions
- * Calculation of population statistics, averages and probabilities set in careers and other real life situations
- * Sporting probabilities are used to explore the concepts of chance and the difference between theoretical & experimental probability

FUNCTIONAL PROJECTS

In Key Stage 3, students are given the opportunity to use their maths skills to solve real life problems and complete functional projects. Students will also develop employability skills such as preparing & giving presentations, planning & delivering a project to meet a brief and working collaboratively within a team.

Year 7 Christmas Presents

In the Christmas Presents project, students take the role of personal shoppers and will begin with a budgeting task, where they must buy one gift for family member and friend before using time, map and compass skills to plan a route to deliver the presents, where they must limit distance, convert using a scale and ensure they get everything delivered in time

Year 7 Smoothie Design

In the Smoothie Design project, students take the role of a drinks company, designing and costing a smoothie. Students consider ratio of ingredients, best buys and will conduct a survey and present this data. Students must bring all of these mathematical components together in one final presentation that they share with fellow classmates.

Year 8 Come Dine With Me

In the Come Dine with Me project students take on the role of a party planner and are given a brief and a budget and need to plan, cost and schedule a meal for a dinner party. These budget management and organisational skills are applied directly to a role in catering management and hospitality.

Year 8 Mystery Tours

In the mystery tours project, students will take on the role of tour operators to plan and budget a 3-day tour of the UK. Students practice employability skills required in event management, operational management and logistics.

Year 9 Reducing Road Accidents

In the Reducing Road Accidents project, students take on the role of a council planning committee and are given statistical information about accidents in a town to analyse as well as a budget to and must make decisions about which measures to take and where to place them in order to reduce accidents.

Year 9 Alien Invasion

In the Alien Invasion project, students take on the role of journalists investigating and piecing together a series of clues, both mathematical and non-mathematical to find out what is happening during an alien invasion and report on the event.

Threshold concepts

Number

- Give the place value of digits in integers & decimals
- Read & write numbers in words and figures
- Understand and represent numbers in different ways
- Know number complements to 100
- Add & Subtract integers without a calculator
- Know times tables to 10 x 10 and their corresponding division facts
- Multiply & divide integers of any size without a calculator

Algebra

- Use number machines to find outputs and inputs
- Use word formulae to solve problems
- Use coordinates in the first quadrant

FDPRP

- Represent fractions as diagrams & on a number line
- Express one quantity as a fraction of another
- Find halves and quarters
- Know that $\frac{1}{2} = 50\%$ and $\frac{1}{4} = 25\%$

Geometry

- Know the names of 2D and 3D shapes
- Recognise & draw nets of 3D shapes
- Recognise & draw reflection symmetry
- Know the 4 cardinal points of a compass

Measures

- Tell the time on a 12 hour clock
- Know basic facts about time (eg days in a week, minutes in an hour etc)
- Know units for measuring length, capacity and mass
- Measure lines accurately using a ruler

Statistics

Draw and read information from bar charts & pictograms

Key Stage 3

High Ability	Middle Ability	Low Ability
In years 7-9 students will follow a Spiral maths curriculum allowing students to meet topics multiple times, with increasing complexity each time.		
<p>High ability students will understand the subject content requirements of:</p> <ul style="list-style-type: none"> * KS3 National Curriculum for Maths * Basic & Additional Foundation Content of AQA GCSE Maths * Basic & Additional Foundation Content of AQA GCSE Statistics <p>Allowing students to focus on the Higher content required to achieve Grades 6+ at KS4</p> <p>Throughout the mathematics content, students will be taught to develop fluency, reason mathematically and solve problems.</p> <p>Functional Projects will also be used to develop students understanding of maths in real life situations & a problem solving unit at the end of year 9 will allow students to further develop their reasoning (AO2) and Problem Solving (AO3) skills in preparation for following the KS4 Higher course</p> <p>Students will also take part in the UKMT Maths challenges to further develop their problem solving and mathematical thinking skills</p>	<p>Middle ability students will understand the subject content requirements of:</p> <ul style="list-style-type: none"> * KS3 National Curriculum for Maths * Basic Foundation Content of AQA GCSE Maths * Basic Foundation Content of AQA GCSE Statistics <p>Allowing students to focus on the Additional Foundation content required to achieve Grades 4 & 5 at KS4</p> <p>Throughout the mathematics content, students will be taught to develop fluency, reason mathematically and solve problems</p> <p>Functional Projects will also be used to develop students understanding of maths in real life situations & a problem solving unit at the end of year 9 will allow students to further develop their reasoning (AO2) and Problem Solving (AO3) skills in preparation for following the KS4 Foundation course</p>	<p>Low ability students will understand the subject content requirements of:</p> <ul style="list-style-type: none"> * KS3 National Curriculum for Maths <p>Low ability students will focus on developing fluency with mathematical concepts, methods and techniques</p> <p>In year 7, identified students will complete the CGP Year 7 Catch Up programme to ensure any gaps in understanding from KS2 are addressed and students are able to access and make progress through the KS3 maths curriculum</p> <p>In year 9, identified students will complete the AQA Mathematics Entry Level Certificate to support their transition to KS4 study and prepare them for GCSE</p> <p>Functional Projects will also be used to develop students understanding of maths in real life situations</p>

Key Stage 4

High Ability	Middle Ability	Low Ability
In year 10, students will continue to follow the spiral maths curriculum, meeting the same topics as KS3 but with increased complexity.		
<p>During year 10, students will cover:</p> <ul style="list-style-type: none"> • Higher subject content of AQA GCSE Maths • Higher subject content of AQA GCSE Statistics <p>Throughout the mathematics content, students will be taught to:</p> <ul style="list-style-type: none"> • Use and apply standard techniques (AO1/Fluency) • Reason, interpret & communicate mathematically (AO2/Reasoning) • Solve problems within mathematics & other contexts (AO3/Problem Solving) <p>UKMT Maths challenges to further develop their problem</p>	<p>During year 10, middle ability students will focus on:</p> <ul style="list-style-type: none"> • Additional Foundation subject content of AQA GCSE Maths • Additional Foundation subject content of AQA GCSE Statistics <p>Throughout the mathematics content, students will be taught to:</p> <ul style="list-style-type: none"> • Use and apply standard techniques (AO1/Fluency) • Reason, interpret & communicate mathematically (AO2/Reasoning) • Solve problems within mathematics & other contexts (AO3/Problem Solving) 	<p>During year 10, low ability students will focus on:</p> <ul style="list-style-type: none"> • Foundation subject content of AQA GCSE Maths • Foundation subject content of AQA GCSE Statistics <p>Throughout the mathematics content, students will focus on using and applying standard techniques (AO1/Fluency)</p> <p>Identified students will work on Entry Level skills and follow the MathsBox focus 1-3 intervention program to address any gaps in understanding from KS3 and support in achieving target grades at GCSE</p>
In year 11 students follow a Revision & Exam Practice Scheme of Learning which allows students to prepare for GCSE maths exams at the end of the year.		
<p>QLAs are used following assessments to identify strengths and weaknesses and allow teachers to identify topics needing revision and personalised programmes of intervention are used to ensure students are supported in achieving their target grades.</p> <p>Students will learn exam technique and through revision of subject content, students will develop their ability to:</p> <ul style="list-style-type: none"> • Use and apply standard techniques (AO1/Fluency) • Reason, interpret & communicate mathematically (AO2/Reasoning) • Solve problems within mathematics & other contexts (AO3/Problem Solving) 		
<p>High Ability students will revise the Additional Foundation and Higher subject content of the AQA GCSE Maths specification</p> <p>The most able students will also study the Level 2 Further Maths Qualification.</p> <p>Students will take Higher GCSE Maths & Higher GCSE Statistics at the end of Year 11</p> <p>The Most Able Students will also take L2 Further Maths at the end of Year 11</p>	<p>Middle Ability students will revise both the Basic & Additional Foundation subject content of the AQA GCSE Maths specification</p> <p>Students will take Foundation* GCSE Maths & Foundation GCSE Statistics** at the end of Year 11</p> <p>* Some Middle ability students may take Higher tier maths in order to increase chances of achieving grade 5/6</p> <p>** Some students may not take GCSE Statistics</p>	<p>Low Ability students will revise the Basic Foundation subject content of the AQA GCSE Maths specification</p> <p>Students will take Foundation GCSE Maths at the end of Year 11</p>

DAVID NIEPER ACADEMY MATHS SCHEME OF LEARNING

		KEY STAGE 3				YEAR 10		YEAR 11 & 12 RESIT				A-LEVEL	
		Year 7 SWL, SGI, NBU	Year 8 CWI, NBU, SGI, SWL	Year 9 SGI, CWI, SWL, RBR, NBU	9A (ELC) CWI (9A)	Y10 Teacher A RBR (H), CWI, NBU	Y10 Teacher B RBR (F), SGI, SWL	Y11 HIGHER NBU, CWI	Y11 FOUNDATION RBR, SWL	Y12 RESIT RBR	GCSE STATISTICS ADO	Y12 Teacher A RBR	Y12 Teacher B CWI
AUTUMN 1	TRANSITION UNIT	USING ALGEBRA	SOLVING PROBLEMS	PROPERTIES OF NUMBER	UNIT 1 NUMBER & ALGEBRA	UNIT 2 PLACE VALUE & CALCULATION	CALCULATIONS & ROUNDING	CALCULATIONS & ROUNDING	CALCULATIONS & ROUNDING	STATISTICAL CHARTS & DIAGRAMS	ALGEBRA	BINOMIAL EXPANSION PROOF	
	INTEGERS			CALENDAR & TIME			NUMBER	NUMBER	NUMBER			QUADRATICS & CUBICS	DIFFERENTIATION
	COME DINE WITH ME PROJECT	REDUCING ROAD ACCIDENTS PROJECT	ASSESSMENT 1				SEQUENCES & GRAPHS	SEQUENCES & GRAPHS	SEQUENCES & GRAPHS				
AUTUMN 2	INTRODUCTION TO ALGEBRA	FACTORS, POWERS & ROOTS	MEASURING SHAPES	FOUR OPERATIONS	UNIT 3 EQUATIONS & INEQUALITIES	UNIT 4 FRACTIONS & PERCENTAGES	EQUATIONS & INEQUALITIES	EQUATIONS & INEQUALITIES	NOVEMBER RESIT EXAMS & FS	STATISTICAL MEASURES	INEQUALITIES & SIMULTANEOUS EQNS	INTEGRATION	
	CHRISTMAS PRESENTS PROJECT			RATIO			FDPRP	FDPRP	EQUATIONS & INEQUALITIES		COORDINATE GEOMETRY		
	ASSESSMENT 1	ASSESSMENT 1	ASSESSMENT 1				MOCK EXAMS	MOCK EXAMS	MOCK EXAMS			MOCK EXAMS	MOCK EXAMS
SPRING 1	POWERS OF TEN	2D & 3D SHAPES	ASSESSMENT 2	MONEY	UNIT 5 ALGEBRAIC GRAPHS	UNIT 6 2D & 3D SHAPES	GEOMETRY	GEOMETRY	FDPRP	PROBABILITY	TRIGONOMETRY	QUANTITIES & UNITS IN MECHANICS	
	ASSESSMENT 1	MYSTERY TOURS PROJECT	PROPORTIONAL REASONING	STATISTICS			PERIMETER, AREA & VOLUME	PERIMETER, AREA & VOLUME	PERIMETER, AREA & VOLUME		PERIMETER, AREA & VOLUME	EXONENTIALS & LOGARITHMS	KINEMATICS
							PYTHAGORAS & TRIGONOMETRY	PYTHAGORAS & TRIGONOMETRY	PYTHAGORAS & TRIGONOMETRY				
SPRING 2	STATISTICAL INVESTIGATION	COORDINATE GRIDS	NON-LINEAR ALGEBRA	MEASURES	UNIT 7 RATIO & PROPORTION	UNIT 8 AREA, PERIMETER & VOLUME	TRANSFORMATIONS & CONSTRUCTIONS	TRANSFORMATIONS & CONSTRUCTIONS	GEOMETRY	STATISTICAL ENQUIRY CYCLE	SAMPLING	VECTORS	
	SMOOTHIE DESIGN PROJECT						ASSESSMENT 2	HIGHER ALGEBRA	STATISTICS & PROBABILITY		STATISTICS & PROBABILITY		DATA PRESENTATION & INTERPRETATION
							MOCK EXAMS	MOCK EXAMS	MOCK EXAMS		MOCK EXAMS		
SUMMER 1	TRIANGLES & QUADRILATERALS	PERCENTAGES	STATISTICS & PROBABILITY	GEOMETRY	UNIT 9 STATISTICS & PROBABILITY	UNIT 10 STATISTICAL DIAGRAMS	REVISION & EXAM PREPARATION	REVISION & EXAM PREPARATION	REVISION & EXAM PREPARATION	REVISION & EXAM PREPARATION	PROBABILITY	PULLEYS	
	ASSESSMENT 2						ASSESSMENT 2	ASSESSMENT 3	GCSE EXAMS	GCSE EXAMS	GCSE EXAMS		GCSE EXAMS
SUMMER 2	FRACTIONS	STATISTICS & PROBABILITY	MATHEMATICAL DRAWING	COMPLETE ELC PORTFOLIO	UNIT 11 PYTHAGORAS & TRIGONOMETRY	UNIT 12 ANGLES	GCSE EXAMS	GCSE EXAMS	GCSE EXAMS	GCSE EXAMS	REVISION & EXAMS (MOCK AND/OR AS)	REVISION & EXAMS (MOCK AND/OR AS)	
			ALIEN INVASION						MOCK EXAMS		MOCK EXAMS	FUNCTIONAL SKILLS LEVEL 2	MOCK REVIEW
	ENTERPRISE	ENTERPRISE	ENTERPRISE	ENTERPRISE	ENTERPRISE	ENTERPRISE			ENTERPRISE			ENTERPRISE	ENTERPRISE

DAVID NIEPER ACADEMY MATHS
Year 7 Curriculum Content

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
	INTEGERS	INTRODUCTION TO ALGEBRA	POWERS OF TEN	STATISTICAL INVESTIGATION	TRIANGLES & QUADRILATERALS	FRACTIONS
EMPLOYABILITY	<p>Y7 Transition Unit</p> <ul style="list-style-type: none"> * Use a scientific calculator efficiently * Generate strategies to solve problems * Choose which mathematical skills to use * Evaluate methods <p>Integers Unit</p> <ul style="list-style-type: none"> * Use of negative numbers & LCM in real life situations <p>Reasoning & Problem Solving</p> <ul style="list-style-type: none"> * Develop mathematical vocabulary * Make connections & explore relationships 	<p>Christmas Presents Project</p> <p><i>Students plan how to deliver presents on time</i></p> <ul style="list-style-type: none"> * Read & understand the 12 and 24 hour clock * Convert between different units of time * Use timetables * Know the 8 points of a compass * Describe position using compass directions * Understand scale and draw scale diagrams * Represent a situation from the real world mathematically * Analyse it using mathematical procedures * Interpret results in the context of a problem <p>Introduction to Algebra Unit</p> <ul style="list-style-type: none"> * Using algebra to model situations * Substitution into scientific formulae 	<p>Powers of Ten Unit</p> <ul style="list-style-type: none"> * Measurement & use of metric units in careers based situations * Develop rounding skills and use of estimation * Importance of place value in real life examples <p>Reasoning & Problem Solving</p> <ul style="list-style-type: none"> * Model situations mathematically * Select appropriate methods and techniques * Make and use connections * Generate efficient strategies 	<p>Smoothie Challenge</p> <p><i>Students design and market a smoothie</i></p> <ul style="list-style-type: none"> * Use the unitary method to solve proportional reasoning problems * Represent a situation from the real world mathematically * Generate strategies to solve problems * Interpret & communicate information effectively <p>Statistical Investigation Unit</p> <ul style="list-style-type: none"> * Use of statistics to make decisions; links to how statistics are used in real life * Planning & carrying out a statistical investigation * Questionnaires & samples 	<p>Triangles & Quadrilaterals Unit</p> <ul style="list-style-type: none"> * Use of area & perimeter in real life problems such as decorating rooms, garden design & upholstery <p>Reasoning & Problem Solving</p> <ul style="list-style-type: none"> * make and use connections * interpret information in context * communicate information effectively * make deductions & draw conclusions * construct chains of reasoning 	<p>Fractions Unit</p> <ul style="list-style-type: none"> * Use of probability in real life situations, including sporting probabilities
REVISION OF PRIOR LEARNING	<p>KS2 Calculations</p> <ul style="list-style-type: none"> * Add, subtract, multiply & divide integers of any size without a calculator 	<p>Year 7 Integers (Negative Numbers, Number Properties)</p>	<p>KS2 Place Value & Calculations</p> <p>KS2 Measures</p>	<p>KS2 Statistics</p>	<p>KS2 Shape, Space & Measures</p>	<p>KS2 Fractions</p> <p>Year 7 Powers of Ten (Decimal calculation, place value)</p>
ASSESSMENT	<p>Baseline Assessment (Week 2)</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Sequences & Negative Numbers * Number Properties 	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Algebraic Manipulation * Solving Equations 	<p>Assessment Point 1 (Week 21)</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Powers of Ten * Rounding 	<p>Plan & Carry out a Statistical Investigation</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Representing Data * Statistical Measures 	<p>Assessment Point 2 (Week 30)</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Lines, Shapes & Angles * Area & Perimeter 	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Fractions * Probability
NEW CONTENT	<p>Number Patterns</p> <ul style="list-style-type: none"> * Investigate patterns of numbers & shapes * Generate & continue linear sequences * Describe & use term to term rules <p>Negative Numbers</p> <ul style="list-style-type: none"> * Order & compare positive & negative integers * Calculate temperature changes * Add, subtract, multiply & divide using negative integers <p>Multiples</p> <ul style="list-style-type: none"> * Know times tables to 15 x 15 & their corresponding division facts * Identify multiples from a list * List multiples of a number * Find the LCM of two or more numbers <p>Factors</p> <ul style="list-style-type: none"> * Identify factors from a list * Find all the factors of a number * Find the HCF of two or more numbers <p>Prime Numbers</p> <ul style="list-style-type: none"> * Know & use the definition of a prime number * Recognise all the prime numbers between 1 - 100 <p>Square & Cube Numbers</p> <ul style="list-style-type: none"> * Know square numbers to 152 and their square roots * Use a calculator to square & square root * Know cube numbers to 103 and their cube roots * Use a calculator to cube & cube root 	<p>Algebraic Manipulation</p> <ul style="list-style-type: none"> * Use algebraic vocabulary & notation accurately * Know the basic rule of algebra * Simplify expressions by collecting like terms * Simplify expressions by multiplication & division * Use index notation to show repeated multiplication * Expand a single set of brackets <p>Function Machines</p> <ul style="list-style-type: none"> * Use function machines to find inputs and outputs <p>Inverse Operations & BIDMAS</p> <ul style="list-style-type: none"> * Understand & use inverse operations * Use BIDMAS in calculations <p>Substitution</p> <ul style="list-style-type: none"> * Use word formulae to solve problems * Substitute integer values into formulae & expressions <p>Linear Equations</p> <ul style="list-style-type: none"> * Solve linear equations with one step * Solve linear equations with the unknown on one side * Solve linear equations with unknowns on both sides 	<p>The Number System</p> <ul style="list-style-type: none"> * Understand & represent numbers in different ways * Give the place value of digits in integers & decimals * Read & write integers & decimals in words & figures * Order & compare integers & decimals * Use inequality notation to compare integers & decimals <p>Powers of 10</p> <ul style="list-style-type: none"> * Multiply & divide numbers by 10, 100, 1000, 0.1, 0.01 etc * Manipulate calculations using place value * Multiply & divide numbers by positive & negative powers of 10 * Read, write, order & compare numbers using standard form <p>Decimal Calculations</p> <ul style="list-style-type: none"> * Multiply & divide using integers & decimals <p>Rounding</p> <ul style="list-style-type: none"> * Round integers & decimals to a given degree of accuracy (inc. significant figures) * Give maximum & minimum values for numbers that have been rounded * Find error intervals <p>Measuring</p> <ul style="list-style-type: none"> * Know what we measure & the instruments used to measure * Know & choose appropriate units of measure * Convert between metric units for length, capacity & mass 	<p>Collecting Data</p> <ul style="list-style-type: none"> * Know & use different types of data * Design & carry out a questionnaire * Know and plan for potential problems when collecting data <p>Tables</p> <ul style="list-style-type: none"> * Complete a tally chart * Organise data into frequency tables * Complete & use two way tables <p>Representing Data</p> <ul style="list-style-type: none"> * Draw, extract information from and interpret pictograms, bar charts, & pie charts * Draw, extract information from and interpret dual & compound bar charts <p>Statistical Measures</p> <ul style="list-style-type: none"> * Describe data sets using mean, median, mode & range * Draw & interpret stem & leaf diagrams <p>Statistical Investigation</p> <ul style="list-style-type: none"> * Use the data handling cycle to plan & carry out a statistical investigation 	<p>Properties of 2D Shapes</p> <ul style="list-style-type: none"> * Know names and properties of 2D shapes * Use standard conventions for labelling properties of shapes * Recognise & draw reflection symmetry * Recognise, draw & give the order of rotation symmetry <p>Angles & Lines</p> <ul style="list-style-type: none"> * Describe, sketch & draw different lines & angles using conventional terms & notation * Draw & measure angles accurately * Know & use the sum of angles on a straight line * Know & use the sum of angles round a point <p>Triangle & Quadrilateral Properties</p> <ul style="list-style-type: none"> * Recognise & give the properties of different types of triangle & quadrilateral * Know and use the sum of angles in a triangle * Know & use the sum of angles in a quadrilateral <p>Constructions</p> <ul style="list-style-type: none"> * Use a protractor and a pair of compasses * Construct triangles using SAS, SSS and ASA <p>Area & Perimeter</p> <ul style="list-style-type: none"> * Find perimeter, area & volume by counting squares/cubes * Calculate the perimeter of 2D Shapes * Calculate the area & perimeter of rectangles * Calculate the area of parallelograms, triangles and trapezia * Calculate compound areas made from triangles & quadrilaterals 	<p>Fractions</p> <ul style="list-style-type: none"> * Represent fractions as diagrams and on a number line * Express one quantity as a fraction of another * Find equivalent fractions * Simplify fractions using HCF * Convert between mixed numbers & improper fractions <p>Fraction Calculations</p> <ul style="list-style-type: none"> * Calculate a fraction of an amount * Multiply fractions & mixed numbers * Divide fractions & mixed numbers * Add & subtract fractions with the same denominator <p>Probability</p> <ul style="list-style-type: none"> * Use the probability scale * Calculate the probability of an event happening * Know & use the sum of probabilities * Understand the difference between theoretical & experimental probability * Calculate relative & expected frequencies

DAVID NIEPER ACADEMY MATHS
Year 8 Curriculum Content

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
	USING ALGEBRA	FACTORS, POWERS AND ROOTS	2D & 3D SHAPES	COORDINATE GEOMETRY	PERCENTAGES	STATISTICS & PROBABILITY
EMPLOYABILITY	<p>Come Dine With Me Project <i>Students will take on the role of party planners to plan a dinner party</i></p> <ul style="list-style-type: none"> * Adapt recipe quantities using unitary method * Solve problems using time & plan a schedule * Solve problems using units of measure * Prepare a shopping list to stick to a budget * Work collaboratively * Model real life situations mathematically * Plan & carry out a project to meet a brief <p>Using Algebra Unit</p> <ul style="list-style-type: none"> * Use links to science & engineering to solve problems using algebra * Construct & solve equations & formulae to represent real 	<p>Factors, Powers & Roots Unit</p> <ul style="list-style-type: none"> * Solve real life problems using HCF & LCM * Calculate using fractions in context <p>Reasoning & Problem Solving</p> <ul style="list-style-type: none"> * Model situations mathematically * Select appropriate methods & techniques to solve a problem * Make & use connections which may not be immediately obvious 	<p>Mystery Tours Project <i>Students will take on the role of tour operators to plan a tour of the UK</i></p> <ul style="list-style-type: none"> * Calculate with fractions * Extract information from tables & charts * Use calculator methods to solve problems * Work collaboratively with others * Plan & carry out a project to meet a brief * Prepare & give a report * Develop use of mathematical knowledge to solve financial problems <p>2D & 3D Shapes Unit</p> <ul style="list-style-type: none"> * Interpret & use measures, area & perimeter in real life situations 	<p>Coordinate Geometry Unit</p> <ul style="list-style-type: none"> * Use coordinates in real life situations, including maps and navigation * Modelling real life situations graphically, including conversions <p>Reasoning & Problem Solving</p> <ul style="list-style-type: none"> * Develop use of mathematics to interpret & solve problems * Make connections between number relationships & graphical representations * Interpret results in the context of a problem * Generate efficient strategies to solve problems 	<p>Percentages Unit</p> <ul style="list-style-type: none"> * Calculate percentages of amounts in context of sales, retail and other industries * Calculate profit & loss * Calculate compound interest, depreciation and use percentages in other financial situations <p>Reasoning & Problem Solving</p> <ul style="list-style-type: none"> * Develop use of formal mathematical methods in financial mathematics * Model situations mathematically * Select appropriate concepts, methods & techniques * Interpret results in context 	<p>Statistics & Probability Unit</p> <ul style="list-style-type: none"> * Plan & carry out a statistical investigation to help a company make decisions * Present and interpret information * Communicate results <p>Reasoning & Problem Solving</p> <ul style="list-style-type: none"> * Explore what can and cannot be inferred in statistical settings * Interpret results in the context of the problem * Make deductions and draw conclusions
REVISION OF PRIOR LEARNING	<p>Year 7 Integers (Number Patterns)</p> <p>Year 7 Introduction to Algebra</p> <p>Year 7 Triangles & Quadrilaterals (Area, Perimeter & Angles)</p>	<p>Year 7 Integers (Number Properties)</p>	<p>Year 7 Powers of Ten (Measures, Rounding)</p> <p>Year 7 Triangles & Quadrilaterals</p>	<p>Year 7 Introduction to Algebra (Substitution)</p> <p>Year 7 Triangles & Quadrilaterals (Symmetry, Properties of shape)</p> <p>Year 8 Using Algebra (Changing the subject, nth Terms)</p>	<p>Year 7 Fractions</p> <p>Year 7 Powers of Ten (Place Value, Multiplying by 10, 100)</p> <p>Proportional Reasoning (Unitary Method)</p>	<p>Year 7 Statistical Investigations</p> <p>Year 7 Fractions (Probability)</p>
ASSESSMENT	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Nth Terms & Algebraic Manipulation * Construct & Solve Equations 	<p>Assessment Point 1 (Week 11)</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Factors & Factorising * Powers & Roots 	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Shapes & Angles * Area & Volume 	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Linear Graphs * Transformations 	<p>Assessment Point 2 (Week 32)</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Equivalent FDP * Percentages 	<p>Plan & Carry out a statistical investigation</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Statistics & Probability * Statistical Diagrams (inc. scatter graphs)
NEW CONTENT	<p>Algebraic Manipulation</p> <ul style="list-style-type: none"> * Simplify expressions involving brackets * Construct algebraic expressions to represent real life situations * Use formulae to represent real life situations & solve problems * Change the subject of a formula <p>Nth Terms</p> <ul style="list-style-type: none"> * Generate sequences using nth terms * Find the nth term of a linear sequence <p>Angles</p> <ul style="list-style-type: none"> * Know & use angle properties of parallel lines <p>Linear Equations</p> <ul style="list-style-type: none"> * Construct & solve linear equations using area, perimeter and angles <p>Inequalities</p> <ul style="list-style-type: none"> * Represent inequalities on a number line * Solve linear inequalities 	<p>Factors & Factorising</p> <ul style="list-style-type: none"> * Find algebraic factors & HCF * Simplify surds using factors * Factorise algebraic expressions by taking out common factors <p>Fractions</p> <ul style="list-style-type: none"> * Add & subtract fractions & mixed numbers <p>Prime Factors</p> <ul style="list-style-type: none"> * Write a number as a product of prime factors * Use prime factors to find HCF & LCM of two or more numbers <p>Powers</p> <ul style="list-style-type: none"> * Calculate powers of numbers * Recognise powers of 2, 3, 4, 5 and 10 * Know & use index laws to simplify expressions <p>Roots</p> <ul style="list-style-type: none"> * Calculate & estimate roots of numbers * Solve simple equations involving x^2 * Multiply & divide using surds 	<p>Polygons</p> <ul style="list-style-type: none"> * Use the sum of exterior angles in polygons * Calculate the sum of interior angles in polygons * Investigate tessellations <p>Circles</p> <ul style="list-style-type: none"> * Name & draw different parts of a circle * Use a pair of compasses accurately <p>Circumference</p> <ul style="list-style-type: none"> * Calculate the circumference of a circle * Calculate the perimeter of semicircles & quadrants * Calculate perimeter of shapes made from circles <p>Area of Circles</p> <ul style="list-style-type: none"> * Calculate the area of a circle * Calculate the area of semicircles & quadrants * Calculate the area of shapes made from circles <p>Measuring</p> <ul style="list-style-type: none"> * Convert between metric units for area & volume <p>3D Shapes</p> <ul style="list-style-type: none"> * Know the names & properties of 3D shapes * Recognise & draw accurate nets of 3D shapes * Draw & interpret plans & elevations <p>Volume & surface area of Prisms</p> <ul style="list-style-type: none"> * Calculate the volume of prisms 	<p>Coordinates</p> <ul style="list-style-type: none"> * Use coordinates in all four quadrants * Find midpoints of coordinates * Make links between coordinates & rules * Draw graphs of $x=a$ and $y=a$ <p>Real Life Graphs</p> <ul style="list-style-type: none"> * Plot & use conversion graphs * Plot & use linear graphs representing real life situations <p>Linear Graphs</p> <ul style="list-style-type: none"> * Plot a table of values & draw a linear graph * Calculate gradient of a line * Work out the equation of a line * Find the equation of a line parallel to a given line <p>Transformations</p> <ul style="list-style-type: none"> * Describe & draw translations, reflections & rotations <p>Column Vectors</p> <ul style="list-style-type: none"> * Understand movements a column vectors * Add & subtract column vectors 	<p>Understanding Percentages</p> <ul style="list-style-type: none"> * Represent percentages as diagrams & on a number line * Understand percentages as parts per 100 * Write one quantity as a percentage of another <p>Equivalent FDP</p> <ul style="list-style-type: none"> * Recall and use FDP conversions for $1/2$, $1/3$, $1/4$, $1/5$, $1/8$, $1/10$ and $1/100$ * Convert between fractions, decimals & percentage with and without a calculator <p>Percentages of Amounts</p> <ul style="list-style-type: none"> * Calculate percentages of amounts with and without a calculator * Increase or decrease a quantity by a given percentage * Understand and use multipliers <p>Percentage Change</p> <ul style="list-style-type: none"> * Calculate a percentage change including profit & loss <p>Reverse Percentages</p> <ul style="list-style-type: none"> * Calculate reverse percentages 	<p>Statistical Enquiry</p> <ul style="list-style-type: none"> * Use data handling cycle to plan an investigation * Know & use different types of data * Select an appropriate sample * Begin to plan for potential problems when collecting data <p>Averages & Range</p> <ul style="list-style-type: none"> * Calculate averages from data given in tables <p>Scatter Graphs</p> <ul style="list-style-type: none"> * Draw a scatter graph accurately * Describe & interpret correlation * Draw & use lines of best fit <p>Statistical Diagrams</p> <ul style="list-style-type: none"> * Draw, extract information from & interpret time series graphs * Draw, extract information from & interpret choropleth maps & population pyramids <p>Probability</p> <ul style="list-style-type: none"> * List all the possible outcomes of an event happening, including using sample space diagrams * Calculate relative frequency & expected outcomes <p>And/Or Rule</p> <ul style="list-style-type: none"> * Know & use the OR rule for probability * Know & use the AND rule for probability

DAVID NIEPER ACADEMY MATHS
Year 9 Curriculum Content

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
	SOLVING PROBLEMS	MEASURING SHAPES	PROPORTIONAL REASONING	NON-LINEAR ALGEBRA	STATISTICS	MATHEMATICAL DRAWINGS
EMPLOYABILITY	<p>Reducing Road Accidents <i>Students become town planners using statistical analysis and budgetting to plan how to reduce road accidents</i></p> <ul style="list-style-type: none"> * represent a situation from the real world, analyse it using mathematical procedures, interpret and evaluate the evidence and communicate and reflect on their results * Use rules of arithmetic applied to calculations and manipulations with rational numbers * Apply ratio and proportion * present and analyse data <p>Solving Problems Unit * Use mathematics to solve problems set in careers and other real life contexts</p>	<p>Measuring Shapes Unit * Real life and careers based applications of Pythagoras including within the construction industry</p> <ul style="list-style-type: none"> * How trigonometry is used in real life contexts including by crime scene investigators & in navigation (https://sites.google.com/site/therealworldtrigonometry/about) * Calculating areas & volumes <p>Reasoning & Problem Solving * Develop mathematical knowledge to aid in solving functional multi-step problems</p> <ul style="list-style-type: none"> * Model real life situations mathematically * Select appropriate methods & techniques to solve problems * Generate efficient strategies to solve problems 	<p>Proportional Reasoning Unit * Use of proportional reasoning in a variety of real life contexts and careers</p> <ul style="list-style-type: none"> * Solving functional problems using proportional reasoning * Calculating and solving problems using speed, pressure & density * Use of scale factors in real life contexts & careers <p>Reasoning & Problem Solving * Make connections between numerical problems and algebraic & graphical representations</p> <ul style="list-style-type: none"> * Recognise when a problem requires proportional reasoning * Model real life situations using formal mathematical representations * Select appropriate mathematical methods to solve unfamiliar problems 	<p>Non-Linear Algebra Unit * Recognising and describing patterns/sequences in art, design and nature</p> <ul style="list-style-type: none"> * Construct and solve quadratic equations to solve functional problems <p>Reasoning & Problem Solving * Interpret & communicate information efficiently</p> <ul style="list-style-type: none"> * Make connections between real life, numerical, algebraic and graphical representations * Express relationships algebraically & graphically * Develop mathematical techniques to solve complex & multi-step problems * select appropriate concepts, methods & techniques to solve problems * Interpret results in the context of a problem 	<p>Statistics Unit * Plan and carry out statistical investigations</p> <ul style="list-style-type: none"> * Use population statistics in real life contexts * Use and interpret data collected from real life and employer based situations <p>Reasoning & Problem Solving * interpret and communicate information effectively</p> <ul style="list-style-type: none"> * make deductions, inferences and draw conclusions * explore what can and cannot be inferred in statistical and probabilistic settings, and begin to express their arguments formally * select appropriate concepts, methods and techniques * interpret results in the context of the given problem * critically evaluate methods, arguments, results and the assumptions made 	<p>Alien Invasion <i>Students become journalists to investigate and report on an alien invasion</i></p> <ul style="list-style-type: none"> * use and apply mathematics to solve problems in familiar and unfamiliar contexts; * work logically towards results and solutions; * calculate accurately * estimate, approximate and check working; * relate findings to the original context; * estimate and calculate using measures in everyday situations * use and interpret maps and scale drawings * discuss and interpret graphs arising from real situations <p>Mathematical Drawing Unit * Use of bearings & scale in navigation * Use of constructions & loci in construction & design</p>
REVISION OF PRIOR LEARNING	<ul style="list-style-type: none"> * Find & use HCF, LCM & Prime Factors * Evaluate indices & use index laws * Evaluate & simplify roots * Write numbers using standard form * Calculate percentages, including increases, decreases, percentage change & reverse percentages * Angle properties, including parallel lines & interior & exterior angles of polygons * Perimeter of 2D shapes 	<p>Year 7 Triangles & Quadrilaterals</p> <p>Year 8 2D & 3D Shapes</p> <p>Year 7 Integers (Squares & Square Roots)</p> <p>Year 7 Powers of Ten (Measures)</p>	<p>Recipes (from functional projects) * Work out quantities for recipes by scaling up or down * Solve functional problems involving recipes</p> <p>Unitary Method (from functional projects) * Use the unitary method to solve problems</p> <p>Year 8 Using Algebra & Coordinate Grids</p>	<p>Year 7 Introduction to Algebra</p> <p>Year 8 Using Algebra</p> <p>Year 8 Factors, Powers & Roots</p> <p>Year 8 Coordinate Grids</p>	<p>Year 7 Statistical Investigation</p> <p>Year 8 Statistics & Probability</p> <p>Year 7 Fractions (Probability)</p>	<p>Year 7 Triangles & Quadrilaterals</p> <p>Year 8 2D & 3D Shapes</p> <p>Year 8 Coordinate Grids (Transformations)</p> <p>Year 9 Proportional Reasoning (Scale Factors)</p>
ASSESSMENT	<p>Assessment Point 1 (Week 7)</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Number Problems * Percentage Problems * Using Equations 	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Pythagoras & Trigonometry * Area & Volume 	<p>Assessment Point 2 (Week 18)</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Proportion Problems * Ratio 	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Sequences & Graphs * Solving Quadratics 	<p>Mastery Checks</p> <ul style="list-style-type: none"> * Statistical Enquiry * Statistical Diagrams * Probability 	<p>End of KS3 Assessment</p> <p>Mastery Checks</p> <ul style="list-style-type: none"> * Constructions & Loci
NEW CONTENT	<p>PROBLEM SOLVING * express relations between variables algebraically * begin to reason deductively in number and algebra * develop mathematical knowledge, in part through solving problems and evaluating the outcomes, including multi-step problems * develop their use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics * select appropriate concepts, methods and techniques to apply to unfamiliar and nonroutine problems. * generate efficient strategies to solve complex mathematical and non-mathematical problems by translating them into a series of mathematical processes</p> <p>NUMBER PROBLEMS * Solve problems using factors, multiples, primes, powers and roots</p> <p>STANDARD FORM * Add, subtract, multiply & divide using numbers given in standard form</p> <p>PERCENTAGES PROBLEMS * Solve functional problems using percentages * Calculate percentages, including increases, decreases, percentage change & reverse percentages * Calculate compound percentage</p> <p>USING EQUATIONS TO SOLVE PROBLEMS * Construct & solve equations to solve problems</p>	<p>Pythagoras * Use Pythagoras theorem to find unknown sides and solve problems using right angled triangles</p> <p>Trigonometry * Understand SOHCAHTOA to find unknown sides and angles & solve problems using right angled triangles * Know & use exact trig values</p> <p>Compound Shapes * Calculate the area & perimeter of semi-circles and quadrants * Calculate the area & perimeter of shapes made from triangles, quadrilaterals & circles * Solve functional problems using compound areas</p> <p>Arcs & Sectors * Calculate arc length & area of a sector</p> <p>Volume & Surface Area * Calculate the volume & surface area of cones, spheres & pyramids using given formulae</p>	<p>Scale * Use scale factors and map scales * Draw scale diagrams</p> <p>Similar Shapes * Calculate sides & angles of similar shapes * Calculate area & volume of similar shapes</p> <p>Enlargements * Describe & draw enlargements</p> <p>Compound Measures * Calculate and solve problems involving speed * Calculate distance or time given information about speed * Calculate pressure or density</p> <p>Ratio * Use ratio notation * Simplify & compare ratios * Understand the link between ratio & fractions * Use equivalent ratios to solve ratio problems * Divide a quantity into a given ratio * Solve functional problems using ratio</p> <p>Direct and Inverse Proportion * Draw & use graphs to show direct proportion * Set up and use equations for direct and inverse proportion</p>	<p>Non-Linear Sequences * Recognise different types of non-linear sequence * Continue a non-linear sequence * Find the nth term of a quadratic sequence</p> <p>Quadratic Graphs * Complete a table of values & draw a quadratic graph * Recognise the features of a quadratic graph * Use a quadratic graph to solve an equation</p> <p>Non-Linear Graphs * Complete a table and draw other non-linear graphs * Recognise the shapes of different types of graph</p> <p>Double Brackets * Expand the product of two or more brackets</p> <p>Factorising Quadratics * Factorise quadratic expressions * Recognise & use the difference of two squares</p> <p>Quadratic Equations * Use factorising to solve quadratic equations</p>	<p>Statistical Enquiry * Know and use a wider range of statistical vocabulary & types of data * Understand & use control groups * Describe the advantages & disadvantages of different data collection methods * Know how to collect a sample using random, systematic and quota sampling; Calculate a stratified sample</p> <p>Diagrams for Continuous Data * Identify which statistical diagram to use for different types of data * Draw, extract & interpret information using histograms & frequency polygons</p> <p>Statistical Measures * Calculate & interpret moving averages * Calculate & interpret population statistics</p> <p>Scatter Graphs * Determine the line of best fit using a calculated double mean</p> <p>Frequency Trees * Complete & use frequency trees</p> <p>Venn Diagrams * Understand set notation & Venn diagrams * Calculate probability using Venn diagrams</p> <p>Tree Diagrams * Complete & use a simple tree diagram</p>	<p>Bearings * Describe position using compass directions * Measure & calculate bearings</p> <p>Scale * Understand scale & draw scale diagrams * Use a map scale to solve problems</p> <p>Constructions * Construct perpendicular bisectors * Construct angle bisectors * Construct angles of 90, 60, 45 & 30</p> <p>Loci * Construct the locus of a point Shade regions and solve problems using loci</p>

DAVID NIEPER ACADEMY MATHS
Year 10 Curriculum Content

	AUTUMN 1	AUTUMN 2	SPRING 1	SPRING 2	SUMMER 1	SUMMER 2
Assessment	Common Homeworks	Assessment 1 Common Homeworks	Common Homeworks	Assessment 2 Common Homeworks	Common Homeworks	Y10 Mock Exams Common Homeworks
	UNIT 1 NUMBER & ALGEBRA	UNIT 3 EQUATIONS & INEQUALITIES	UNIT 5 ALGEBRAIC GRAPHS	UNIT 7 RATIO & PROPORTION	UNIT 9 STATISTICS & PROBABILITY	UNIT 11 PYTHAGORAS & TRIGONOMETRY
REVISION OF PRIOR LEARNING	<ul style="list-style-type: none"> * Order, compare & calculate using negative values * Know times tables to 15x15 & their corresponding division facts * Solve problems using factors, multiples, HCF & LCM * Know & use prime numbers between 1 & 100 * Write a number as a product of prime factors * Know & use square numbers to 15² & their square roots * Know & use cube numbers to 10³ & their cube roots * Calculate powers & roots of numbers * Simplify algebraic expressions by collecting like terms, multiplying & dividing * Simplify expressions involving brackets * Know & use index laws to simplify expressions * Factorise expressions including quadratics & the difference of two squares * Generate & continue linear sequences using term to term and 	<ul style="list-style-type: none"> * Change the subject of a formula * Solving linear equations, including those with brackets, fractions & unknowns on both sides * Represent inequalities on a number line * Solve linear inequalities * Construct & solve linear equations & inequalities * Expand the product of two brackets * Use factorisation to solve quadratic equations 	<ul style="list-style-type: none"> * Use coordinates in all four quadrants * Find midpoints of coordinates * Plot the graph of a linear function * Calculate the gradient of a line * Work out the equation of a line * Complete a table of values & draw a quadratic graph 	<ul style="list-style-type: none"> * Use proportion to solve problems involving recipes * Use the unitary method to solve proportional reasoning problems * Use ratio notation * Simplify & compare ratios * Understand the link between ratio & fractions * Use equivalent ratio to solve problems * Divide a quantity into a given ratio * Calculate speed * Draw & use distance time graphs * Calculate pressure & density * Understand scale & draw scale diagrams 	<ul style="list-style-type: none"> * Use the data handling cycle to plan an investigation * Know & use different types of data * Design & carry out questionnaires * Plan to avoid potential problems when collecting data * Select an appropriate sample * Describe discrete data sets using mean, median, mode & range * Draw & interpret stem & leaf diagrams * Calculate averages for data given in tables * Understand & use the probability scale * Calculate the probability of an event happening * Complete & use two way tables * Know & use the sum of probabilities * List all the outcomes for events * Use sample space diagrams * Calculate relative & expected frequency 	<ul style="list-style-type: none"> * Use Pythagoras Theorem to solve problems * USE SOHCAHTOA to solve problems
NEW CONTENT	<ul style="list-style-type: none"> * Solve problems using Prime Factors * Understand & use fractional indices <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Understand & use negative indices * Simplify surds & expressions containing surds * Rationalise the denominator 	<ul style="list-style-type: none"> * Solve simultaneous linear equations by substitution & elimination * Understand & use function notation <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Understand & use composite & inverse functions * Solve simultaneous equations where one is non-linear * Solve quadratic inequalities * Solve quadratic equations using the quadratic formula * Solve quadratic equations by completing the square * Find approximate solutions using iteration 	<ul style="list-style-type: none"> * Work out equations of parallel lines <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Work out the equation of perpendicular lines * Recognise & use the features of non-linear graphs * Recognise & use the equation of a circle * Describe transformations of graphs 	<ul style="list-style-type: none"> * Set up and use equations for direct & inverse proportion * Calculate sides & angles of similar shapes * Calculate area & volume of similar shapes * Draw & use conversion graphs * Use map scales 	<ul style="list-style-type: none"> * Calculate & interpret moving averages * Calculate & Interpret population statistics * Use different types of index number in context * Use the product rule for counting outcomes * Complete & use tree diagrams <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Calculate & interpret conditional probability * Know & use the characteristics of a binomial distribution <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Calculate & use standard deviation * Calculate weighted mean, geometric mean & mean seasonal variation * Apply Petersen Capture/Recapture formula * Know & interpret the characteristics of a normal distribution & calculate confidence intervals 	<ul style="list-style-type: none"> * Know & use exact Trig values <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Use Pythagoras & SOHCAHTOA in 3D * Know & use the sine rule to find sides & angles in non-right angled triangles * Know & use the cosine rule to find sides & angles in non-right angled triangles * Know & use 1/2abSinC to find the area of a triangle
	UNIT 2 PLACE VALUE & CALCULATIONS	UNIT 4 FRACTIONS & PERCENTAGES	UNIT 6 2D & 3D SHAPES	UNIT 8 AREA, PERIMETER & VOLUME	UNIT 10 STATISTICAL DIAGRAMS	UNIT 12 ANGLES
REVISION OF PRIOR LEARNING	<ul style="list-style-type: none"> * Give the place value of digits in integers & decimals * Read & write integers & decimals in words & figures * Order & compare integers & decimals * Multiply & divide by 10, 100, 1000, 0.1, 0.01 etc * Manipulate calculations using place value * Multiply & divide by positive & negative powers of ten * Read, write, order & compare numbers written using standard form * Add, subtract, multiply & divide integers and decimals of any size without a calculator * Understand and use BIDMAS in calculations * Use a scientific calculator efficiently * Round integers & decimals to a given degree of accuracy * Give maximum and minimum values for numbers that have been rounded * Use rounding to estimate calculations * Substitute values into formulae & expressions 	<ul style="list-style-type: none"> * Represent fractions as diagrams & on a number line * Express one quantity as a fraction of another * Find & use equivalent fractions * Simplify fractions * Convert between mixed numbers & improper fractions * Calculate a fraction of an amount * Add, subtract, multiply & divide using fractions & mixed numbers * Simplify simple algebraic fractions using a HCF * Convert between equivalent fractions, decimals & percentages with & without a calculator * Calculate percentages of amounts with & without a calculator * Increase or decrease a quantity by a given percentage 	<ul style="list-style-type: none"> * Know & use the sum of angles in a triangle & in a quadrilateral * Recognise & give the properties of different types of triangle & quadrilateral * Use the sum of exterior angles in polygons * Calculate the sum of interior angles in a polygon * Construct triangles using SAS, SSS, ASA & RHS * Recognise & draw reflection symmetry * Recognise & give the order of rotational symmetry * Describe & draw translations, reflections & rotations * Describe & draw enlargements using positive integer scale factors * Understand movements as column vectors 	<ul style="list-style-type: none"> * Read & understand the 12 and 24 hour clock * Solve problems involving time and timetables * Know & choose appropriate units of measure * Convert between metric units for length, capacity, mass, area & volume * Convert between metric & imperial units of measure * Find area & perimeter by counting squares * Calculate the perimeter of 2D shapes * Calculate the area of rectangles, parallelograms, triangles & trapezia * Name & draw different parts of a circle * Calculate area & circumference of circles * Calculate the area of compound shapes * Calculate arc lengths & sector area * Calculate the volume & surface area of prisms * Know the names & properties of 3D shapes * Recognise & draw nets of 3D shapes * Draw & use conversion graphs 	<ul style="list-style-type: none"> * Draw, extract information from & interpret pictograms, bar charts (inc. dual & compound) & Line graphs * Draw & interpret time series graphs, choropleth maps & population pyramids * Draw, extract information from & interpret pie charts * Draw a scatter graph accurately * Describe & interpret the correlation shown on a scatter graph * Draw & use lines of best fit on scatter graphs 	<ul style="list-style-type: none"> * Describe, sketch & draw different types of lines & angles * Know & use the sum of angles on a straight line, round a point, in a triangle & in a quadrilateral * Know & use the angle properties of parallel lines * Measure & calculate bearings * Use the sum of exterior angles in polygons * Calculate the sum of interior angles in a polygon * Draw & measure angles accurately * Construct bisectors & angles of 60, 45 and 30 * Construct & solve problems using loci
NEW CONTENT	<ul style="list-style-type: none"> * Calculate using numbers written in standard form * Find upper & lower bounds for rounded numbers * Use inequality notation to specify error intervals <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Find upper & lower bounds for calculation 	<ul style="list-style-type: none"> * Recognise fractions that will give recurring decimals <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Simplify algebraic fractions (including by factorising quadratics) * Add, subtract, multiply & divide using algebraic fractions * Convert recurring decimals to fractions algebraically * Calculate reverse percentages * Calculate compound percentages, including growth & decay problems 	<ul style="list-style-type: none"> * Know and use the conditions for congruency in triangles * Add & subtract column vectors * Describe & draw enlargements using fractional scale factors <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Describe & draw enlargements using negative scale factors * Describe the changes & invariance achieved by combinations of transformations 	<ul style="list-style-type: none"> * Calculate the volume & surface area of pyramids, spheres & cones using given formulae 	<ul style="list-style-type: none"> * Draw, extract information from & interpret histograms, frequency polygons, cumulative frequency diagrams & box plots * Determine the line of best fit on a scatter graph by drawing through a double mean * Interpret a given Spearman's Rank Correlation <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Interpret Pearson's Product Moment Correlation Coefficient * Determine lines of best fit using regression equations 	<ul style="list-style-type: none"> * Use a combination of angle properties to find unknown angles & solve geometrical problems * Know and use the conditions for congruency in triangles * Add & subtract column vectors * Describe & draw enlargements using fractional scale factors <p>HIGHER TIER ONLY</p> <ul style="list-style-type: none"> * Know and use circle theorems to find angles * Use vectors to construct geometrical arguments & proofs