

# KS3 Mathematics

## Curriculum Intent 2023 - 2024

“Mathematics expresses values that reflect the cosmos, including orderliness, balance, harmony, logic, and abstract beauty.”

— Deepak Chopra

Mathematics is a creative and highly inter-connected 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 subject.

Our curriculum in mathematics aims to develop fluency 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 accurately. We are also striving to allow students to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, develop mathematical arguments and proofs and make conclusions based on logical inferences. Our intention is also for students to 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; as such resilience is a crucial skill that we will be cultivating in students. Students also need to be able to utilise technology effectively, such as scientific calculators, to perform increasingly complex problems (as well having strong written and mental mathematical skills, not instead of). As the repertoire of mathematical skills that a student possesses grows increasingly more complex, so should the ability of students to use their mathematics to model real life situations.

At key stage 3, we promote equality by working through the breadth of the curriculum at the same pace for all students so that all students can achieve regardless of their starting point. There are a number of KS3 Mathematics Clubs which are currently under review (Countdown club, 24 club, TT Rockstars club). We extend our highest attaining students through depth and more challenging problem solving, rather than an acceleration of content. At key stage 4, all students continue their mathematical studies on an appropriate GCSE pathway determined by their prior attainment and performance across key stages 2 and 3 to give them the best chance of achieving well in the subject. In all key stages we also enter our most able students into the annual UKMT maths challenge competition. We intend for a high proportion of our students to go on and study or use mathematics in some form post-16; this means that our key stage 4 curriculum needs to be broad enough to cater for students who will go on to study maths at the highest level in our Further Mathematics and STEP preparation classes to those who will study Core Mathematics to complement their A Level choices.

In addition to the obvious intention of preparing students for more advanced mathematical studies, mathematics also prepares students for future learning in other disciplines and improves the cognitive ability in general of students and, as such, is essential for their personal development. The study of mathematics conditions the brain to see connections and builds neural pathways that make the brain stronger for all other things. Mathematical study enhances students' general intelligence and supports the life-long learning of students by: creating a

framework in the brain for systematic thinking, developing the ability to solve and analyse problems, stretching the mind to work on unfamiliar tasks with confidence, developing the sequencing skills critical to arriving at accurate results or logical conclusions, promoting caution and care in thinking and deciphering complex mathematical problems to arrive at an accurate answer and learning through trial and error to integrate different principles to arrive at a logical conclusion.

In addition to these disciplinary aspects of the mathematics curriculum, the actual mathematical knowledge and skills that students learn are also vitally important in allowing students to achieve elsewhere in school. Topics studied in mathematics are prerequisite for several disciplines across key stages 3, 4 and 5 such as geography, psychology and economics (to name only a few). Mathematics also provides a theoretical springboard for the ever-evolving STEM sector. Nationally, there are huge shortfalls in job applicants with strong STEM skills and reports estimate that the cost of this shortfall is £1.5 billion each year. Furthermore, occupations in the STEM sector are growing at a rate that nearly is nearly double other sectors which could see this shortfall exacerbated. Our intention is to develop students' abilities sufficiently so that they are able to rise to the challenging opportunities this sector has to offer. In the 21<sup>st</sup> century science, technology and engineering are constantly changing and have become increasingly important for society. The mathematical principles that govern these areas, however, have not changed and consequently the breadth and depth of our curriculum aims to future-proof our students in this field. This is all in addition to the inspirational and motivating research that claims that candidates with strong maths skills earn on average 11% more in their lifetime.

Mathematics is a discipline which is universal; transcending language and cultural differences. Throughout its rich history, mathematics has adopted elements from around the world and gives students the opportunity to appreciate fundamental truths and create water-tight arguments based on logic and reasoning; as such it helps contribute to the student's spiritual, moral, spiritual and cultural development.

Ultimately, the intention of the maths curriculum is to provide students with the necessary thinking skills and content to be successful in their next stage of life or education.

## Assessment

The key principles of feedback in the mathematics department are that feedback should:

1. Be specific, accurate and crystal-clear to students.
2. Look forwards not backwards
3. Inform teachers' planning to secure and further students' learning
4. Place the responsibility on the student to forge their next steps
5. Allow students to feel pride

In addition, the maths department assessment and feedback policy should be manageable in terms of staff workload and allow for the prioritisation of planning ahead of marking.

During mathematics lessons

During a student's mathematics lesson is where they will receive the most feedback about their performance in the subject. Feedback will be given each lesson to students by the teacher, who has the expert knowledge to do so. This may happen in a variety of ways, which include (but are not restricted to):

- Questioning by the class teacher as part of whole class teaching
- Questioning by the class teacher as part of a conversation with individuals or small groups
- Use of mini whiteboards
- Low stakes quizzes
- Teacher circulating the classroom and correcting mathematical and spelling errors
- Use of exit tickets

In addition, feedback is given to students automatically by several online platforms: Times Tables Rockstar and Sparx Maths.

Information gathered by these forms of assessment should always be used by the class teacher to help decide how best to ensure that students move forward mathematically.

Due to the right/ wrong nature of mathematics, classwork should be self-assessed (or peer-assessed if the teacher deems appropriate). The quality and quantity of student work should be monitored by teachers; this may take place during the lesson or the class teacher may choose to collect student books and monitor this outside of the lesson. In either case, there is no expectation to see written comments from teachers in student books.

Testing is a key component of assessment in mathematics. Each unit of work has a test that accompanies it. Revision resources are provided between completion of the unit and taking the assessment. Wherever possible, there will be a delay between finishing the unit of work and taking the relevant test. This is to give teachers further insight into what students have *learnt* rather than what they were able to *perform* in lesson. Tests are marked by class teachers and written feedback provided. This may be simply be in the form of ticks, crosses and an overall score or if a key error or misconception has been identified then more detailed feedback would be given (if enough students have made the same error or misconception then this may be addressed with the whole class in lesson time rather than giving written feedback to each student). Records of student scores are stored by class teachers and progress is tracked internally using Edexcel steps. Students are provided with individualised question level analysis from their formal assessment which is cross-referenced against Sparx Maths clips to allow students to work independently to address their targets.

## Homework

Sparx Maths homework – a weekly Sparx Maths homework is set which contains a combination of questions linked to recent classwork and questions on topics covered earlier in the year. The homework is completed through the website [sparxmaths.uk](https://sparxmaths.uk) and students are expected to write down their answers and show workings as they would do in lessons. Sparx Maths uses an algorithm to ensure the level of difficulty is appropriate for each individual student. Each student should be aiming to score 100% in their Sparx Maths homework as the pitch of the homework is individualised and there is video support for every question on the task.

Pupils should also be using Sparx Maths for revision purposes. They are provided with a list of appropriate clips to facilitate this.

### **Clubs and/or intervention**

The following clubs have been offered at lunchtimes for Key Stage 3 Mathematics.

- 24 club
- Countdown club
- Times Table Rockstars Club

Support is also offered to students on a lunchtime drop-in clinic for students who have found their homework tasks difficult.

### **Parental/Carer support**

Parents/ carer are able to support their child by monitoring the standard of homework tasks as mentioned above. Parents can also promote use of Times Tables Rockstars at home which will help students to become fluent with their basic multiplication facts.

### **Helpful sources of information**

<https://sparxmaths.com/>

<https://www.ukmt.org.uk/>

<https://www.drfrostmaths.com/>

<https://www.mathscareers.org.uk/>

### **Connections to future pathways**

Mathematics is important for a wide range of learning within GCSE and vocational qualifications, including the sciences, geography, design and technology, textiles, and engineering.

Although mathematics is important within all occupations, there are particular careers within which mathematics is central to working every day. This includes: architecture, photographer, landscape gardener, construction, cartography, photogrammetrist, drafter, surveyor, regional planner, mechanical engineer, market research analyst, atmospheric scientist, meteorologist, statistician, operations research analyst, insurance broker, financial analyst, psychologist, research developer, sports statisticians, advertising, actuarial sciences.

## Year 7 Overview

Term	Knowledge	Assessment	Connections to learning
Autumn	<p align="center"><b>Number 1 – Place Value</b></p> <p align="center">What is a googol? What is a googolplex? Are there other number systems besides the decimal number system?</p> <p align="center"><b>Number 2 – Types of Number</b></p> <p align="center">If multiplication is repeated addition and division is repeated subtraction, is there an operation for repeated multiplication? Is there an operation for repeated division?</p>		
	<ul style="list-style-type: none"> <li>➤ Place value for integers and decimals</li> <li>➤ Rounding</li> <li>➤ Estimation</li> <li>➤ Upper and lower bounds</li> <li>➤ Metric units</li> <li>➤ Multiplying and dividing by powers of 10</li> <li>➤ Special numbers</li> <li>➤ Square numbers</li> <li>➤ Cube numbers</li> <li>➤ Roots</li> <li>➤ Primes</li> <li>➤ Factors and Multiples</li> <li>➤ Standard Index Form</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit.</li> <li>➤ In addition, students also complete a baseline assessment in this half term.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Essential for all subsequent maths teaching</li> <li>➤ Key vocabulary and language reinforced/ introduced</li> <li>➤ Opportunities for problem solving skills to be developed</li> </ul> <p>1. Personal Development – being numerate</p>
	<p align="center"><b>Number 3 – Calculations</b></p> <p align="center">Why do some operations take priority over others? How do negative numbers fit in with the arithmetic procedures I know from primary school?</p>		

Spring			
	<ul style="list-style-type: none"> <li>➤ Addition of integers and decimals</li> <li>➤ Subtraction of integers and decimals</li> <li>➤ Multiplication of integers and decimals</li> <li>➤ Division of integers and decimals</li> <li>➤ Order of operations</li> <li>➤ Negative Numbers</li> <li>➤ Product rule for counting</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Essential for all subsequent maths teaching</li> <li>➤ Key vocabulary and language reinforced/ introduced</li> <li>➤ Opportunities for problem solving skills to be developed</li> </ul> <p>1. Personal Development – being numerate</p>
	<p style="text-align: center;"><b>Algebra 1 – Expressions</b></p> <p style="text-align: center;">Where does mathematics come from? What does it mean for two expressions to be equivalent?</p>		
Spring	<ul style="list-style-type: none"> <li>➤ Algebraic notation</li> <li>➤ Forming expressions</li> <li>➤ Simplifying by collecting like terms</li> <li>➤ Substitution</li> <li>➤ Expanding brackets</li> <li>➤ Factorising a single bracket</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the units,</li> </ul>	<ul style="list-style-type: none"> <li>➤ Key vocabulary and notation introduced which underpins the rest of algebra from years 7 – 13</li> <li>➤ Modelling of real-life situations introduced</li> <li>➤ Opportunities for problem solving skills to be developed</li> <li>➤ Substitution into formulae introduced at this point which will be used in: physics, chemistry, biology, business studies, computer science, psychology, ICT, geography</li> </ul> <p>1. Personal Development – increasingly abstract thinking</p> <p>6. Cultural Development – algebra as a universal language which transcends</p>
	<p style="text-align: center;"><b>Number 4 – Fractions</b></p>		

	<p>How do we represent numbers that are not whole? How do we calculate with numbers that are not whole?</p>		
Summer	<ul style="list-style-type: none"> <li>➤ Equivalent fractions and decimals</li> <li>➤ Equivalent fractions</li> <li>➤ Simplifying fractions</li> <li>➤ Mixed numbers and improper fractions</li> <li>➤ Adding and subtracting fractions</li> <li>➤ Multiplying fractions</li> <li>➤ Dividing fractions</li> <li>➤ Fractions of amounts</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Key vocabulary and notation introduced which underpins the rest of algebra from years 7 – 13</li> <li>➤ Modelling of real-life situations introduced</li> <li>➤ Problem solving skills further developed through a variety of strands</li> <li>➤ Solving equations is an important skill across the Science disciplines and in business studies.</li> </ul> <p>1. Personal Development – being numerate</p>
	<p><b>Algebra 2 – Equations</b></p> <p>Was mathematics discovered or invented? If we know the value of an expression, can we find the value of the variable?</p>		
	<ul style="list-style-type: none"> <li>➤ Understand a solution to an equation</li> <li>➤ Solving linear equations</li> <li>➤ Solving linear equations with unknowns on both sides</li> <li>➤ Solving linear equations involving brackets</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Links to first number units, in particular place value and operations.</li> <li>➤ Links to first geometry unit (measures)</li> <li>➤ Links to subsequent number and algebra units</li> <li>➤ Decimals linked to anything involving money</li> <li>➤ Links to all of the sciences, geography, psychology, business, computing and computer science.</li> </ul> <p>1. Personal Development – increasingly abstract thinking 6. Cultural Development – algebra as a universal language which transcends</p>

### Algebra 3 – Sequences

How do we continue a number pattern?

If I needed to find the 100<sup>th</sup> term in a sequence, is there a quicker way than just continuing the sequence until I reach it?

- Continuing sequences
- Term-to-term rules
- Position-to-term rules
- Nth term
- Arithmetic and geometric sequences
- Fibonacci sequence

- Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.
- Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit

- Links to business studies, medicine,
  - Links to financial topics (e.g. compound interest)
  - Fibonacci sequences give rise to lots of opportunity for enrichment such as galaxy formations, nature, weather patterns
  - Linked to biology, DNA, population modelling
1. Personal Development – increasingly abstract thinking
  6. Cultural Development – algebra as a universal language which transcends

## Year 8 Overview

Term	Knowledge	Assessment	Connections to learning
Autumn	<p style="text-align: center;"><b>Data 1 – Averages</b></p> <p style="text-align: center;">What is the most efficient of summarising a set of data? Is one average better to use than another?</p> <p style="text-align: center;"><b>Algebra 4 – Quadratics</b></p> <p style="text-align: center;">How do we extend our arithmetic skills to let us multiply expressions together? What is the point of quadratic equations?</p>		



	<ul style="list-style-type: none"> <li>➤ Types of data</li> <li>➤ Mean</li> <li>➤ Median</li> <li>➤ Mode</li> <li>➤ Range</li> <li>➤ Averages from frequency tables</li> <li>➤ Averages from grouped frequency tables</li>   <li>➤ Multiplying expressions</li> <li>➤ Index laws</li> <li>➤ Expanding double brackets</li> <li>➤ Factorising double brackets</li> <li>➤ Solving a quadratic equation</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Links to previous learning on data</li> <li>➤ Crucial for any student studying GCSE statistics or A Level statistics</li> <li>➤ Opportunities provided to develop literacy through analysing and interpreting data</li> <li>➤ Links to proportional reasoning (pie charts)</li> <li>➤ Builds on year 7 content involving equations and formulae</li> <li>➤ Key concepts that need to be understood in GCSE (including quadratic equations and simultaneous equations)</li> <li>➤ Further opportunities for students to model real-life situations as mathematical equations</li> <li>➤ Data presentation used in a variety of subject areas (e.g. geography, psychology, biology, BITE)</li> <li>➤ Any individual working in industry as an adult will use data</li> <li>➤ Used to analyse data in sport</li> <li>➤ Used throughout school to analyse test scores/ GCSE results etc</li> <li>➤ Rearranging formulae needed in the sciences, geography, psychology, BITE</li> <li>➤ Algebra skills here used a lot in KS5 science</li> <li>➤ Algebra used extensively in computer animation</li> <li>➤ Quadratics arise in physics often when modelling kinematics using <math>s=ut+(1/2)at^2</math></li> </ul> <p>1. Personal Development – Being data literate</p>
<p style="text-align: center;"><b>Number 5 – Percentages</b></p> <p style="text-align: center;">What happens to my money if I leave it in the bank? How much money do I pay the bank when I take out a mortgage?</p>			

	<ul style="list-style-type: none"> <li>➤ Arithmetic with fractions</li> <li>➤ Equivalences with percentages</li> <li>➤ Percentages of amounts</li> <li>➤ Percentage change</li> <li>➤ Expressing a value as a percentage of another</li> <li>➤ Reverse percentages</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Builds on year 7 content on fractions and decimals</li> <li>➤ Integral in understanding of proportional change, multiplacative reasoning and financial maths.</li> <li>➤ Decimals and percentages linked to anything involving money</li> <li>➤ Growth and decay essential in finance, science and geography.</li> </ul> <ol style="list-style-type: none"> <li>1. Personal Development – Being numerate</li> <li>1. Personal Development – Understanding of financial mathematics (sales in shops, interest rates)</li> </ol>
	<p style="text-align: center;"><b>Shape 1 – Angles</b></p> <p style="text-align: center;">Is a square a parallelogram? Why do some shapes fit together nicely and others don't?</p>		
Spring	<ul style="list-style-type: none"> <li>➤ Properties of 2D shapes</li> <li>➤ Parallel and perpendicular lines</li> <li>➤ Angles in straight lines and full turns</li> <li>➤ Angles in triangles</li> <li>➤ Angles in polygons</li> <li>➤ Angles in parallel lines</li> <li>➤ Problem solving with angles</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Key vocabulary and language reinforced/ introduced</li> <li>➤ Essential for subsequent geometry skills</li> <li>➤ Opportunities for problem solving skills to be developed</li> <li>➤ Geometric reasoning developed and constructing a logical, reasoned argument</li> <li>➤ Problem solving skills developed – especially use of diagrams to help (bar modelling)</li> <li>➤ Links to previous fractions unit</li> <li>➤ Underpins several major skills in the GCSE</li> <li>➤ Links to STEM subjects; specifically technology, design, art, architecture and engineering</li> <li>➤ Bearings/ angles/ scales in particular links to map skills and Duke of Edinburgh</li> </ul>

			<p>➤ Precision in geometry needed for careers in architecture, engineering and design</p> <p>1. Personal Development – creating a logical chain of reasoning</p>
	<p><b>Number 6 – Ratio</b></p> <p>How much is my money worth when I go abroad? How much will it cost me to drive to London?</p>		
	<p>➤ Ratio notation</p> <p>➤ Sharing in a ratio</p> <p>➤ Simplifying ratio</p> <p>➤ Combining ratios</p> <p>➤ Unit ratio</p> <p>➤ Compound measures (including speed and density)</p> <p>➤ Similarity</p>	<p>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</p> <p>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</p>	<p>➤ Problem solving skills developed by extended variety of diagrams that students are able to draw to help solve problems</p> <p>➤ Links to prior learning using ratio, proportion, FDPs</p> <p>➤ Scales used in map reading</p> <p>➤ Proportionality used in food tech to change recipes, art to change colour shades</p> <p>1. Personal Development – being numerate</p> <p>1. Personal development – understanding of financial mathematics (exchange rates, best value for money)</p>
Summer	<p><b>Shape 2 – Mensuration</b></p> <p>How much space fits inside a shape? What is pi? Where did it come from?</p>		
	<p>➤ Units of measurement</p> <p>➤ Perimeter</p> <p>➤ Area of rectangles</p> <p>➤ Area of triangles</p> <p>➤ Area of parallelograms</p> <p>➤ Area of trapezia</p> <p>➤ Area of compound shapes</p> <p>➤ Circumference of a circle</p>	<p>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</p>	<p>➤ Links to calculations work in year 7 (needing to multiply, divide to calculate e.g.)</p> <p>➤ Develop ability to reason geometrically</p> <p>6. Cultural Development – maths representing modern Britain by having contributions from across the globe</p>

	<ul style="list-style-type: none"> <li>➤ Area of a circle</li> <li>➤ Volume of a cuboid</li> <li>➤ Volume of a prism</li> <li>➤ Surface area</li> <li>➤ Volume and surface area of a prism</li> </ul>	<ul style="list-style-type: none"> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	
<p align="center"><b>Shape 3 – Transformations</b></p> <p align="center">When a shape is transformed, does anything stay the same? What information do we need to accurately describe how shapes have changed?</p>			
	<ul style="list-style-type: none"> <li>➤ Coordinates</li> <li>➤ Symmetry</li> <li>➤ Rotation</li> <li>➤ Reflection</li> <li>➤ Translation</li> <li>➤ Enlargement</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Skills in coordinate geometry essential for all graphs work in Year 9 and KS4</li> <li>➤ Develop ability to reason geometrically</li> <li>➤ Coordinate geometry underpins skills across the curriculum especially in natural and social sciences.</li> <li>➤ Links to graphics, design, art and computing</li> </ul> <p>6. Cultural Development – rangoli patterns linking symmetry to Diwali</p>

## Year 9 Overview

Term	Knowledge	Assessment	Connections to learning
Autumn	<p><b>Algebra 5 – Graphs</b></p> <p>How are algebra and geometry linked? How can we represent an equation on a diagram?</p>		

	<ul style="list-style-type: none"> <li>➤ Coordinate geometry</li> <li>➤ Tables of values</li> <li>➤ Plotting linear graphs</li> <li>➤ Real life graphs</li> <li>➤ Quadratic graphs</li> <li>➤ Simultaneous equations graphically</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Links to Y8 work on Axes and Coordinates.</li> <li>➤ Use of technology to generate tables of values</li> <li>➤ Essential for graphs work at GCSE and A Level</li> <li>➤ Links to GCSE and A Level work.</li> <li>➤ Use of technology with standard form and indices on the calculator.</li> <li>➤ Surds link to work on Area and Pythagoras.</li> <li>➤ Physics, economics both make use of this area</li> <li>➤ Essential for coordinate geometry and linear programming at A Level</li> <li>➤ Understanding risk inherent in this topic</li> <li>➤ Physics, economics both make use of this area</li> <li>➤ Essential for coordinate geometry and linear programming at A Level</li> </ul> <p>1. Personal Development – increasingly abstract thinking</p> <p>6. Cultural Development – algebra as a universal language which transcends</p>
	<p style="text-align: center;"><b>Data 2 - Probability</b></p> <p style="text-align: center;">What language do we talk about to discuss risk? Is there ever such a thing as a “safe bet”?</p> <p style="text-align: center;"><b>Algebra 6 – Formulae</b></p> <p style="text-align: center;">What formulae and equations will I need in my other subjects? Can I change a formula to make one of the other letters the output?</p>		

	<ul style="list-style-type: none"> <li>➤ Language of probability</li> <li>➤ Probability scale</li> <li>➤ Mutually exclusive events</li> <li>➤ Sample space diagrams</li> <li>➤ Two way tables</li> <li>➤ Venn diagrams</li> <li>➤ Probability trees</li> <li>➤ Solving equations</li> <li>➤ Understanding formulae</li> <li>➤ Rearranging formulae</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ All key algebra skills required for GCSE should be embedded through KS3 units on algebra and equations.</li> <li>➤ Rearranging formulae needed in the sciences, geography, psychology, BITE</li> <li>➤ Algebra skills here used a lot in KS5 science</li> <li>➤ Algebra used extensively in computer animation</li> <li>➤ Quadratics arise in physics a lot when modelling kinematics using <math>s=ut+(1/2)at^2</math></li> <li>1. Personal Development – increasingly abstract thinking</li> <li>1. Personal development – understanding risk</li> <li>6. Cultural Development – algebra as a universal language which transcends</li> </ul>
	<p style="text-align: center;"><b>Number 7 – Indices and Roots</b></p> <p style="text-align: center;">Does a negative power mean the answer is negative? Does a fractional power mean the answer is a fraction?</p>		
Spring	<ul style="list-style-type: none"> <li>➤ Indices</li> <li>➤ Index laws</li> <li>➤ Roots</li> <li>➤ Fractional indices</li> <li>➤ Negative indices</li> <li>➤ Simplifying surds</li> <li>➤ Estimating square roots</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Links to all previous data topics</li> <li>➤ Prepares students for studying A Level maths, Core Maths</li> <li>➤ Provides opportunity for literacy as a focus of this unit is interpretation of data and charts</li> <li>➤ Use of technology using Excel to display data</li> <li>➤ Standard form used extensively in science</li> <li>➤ Multiplicative reasoning used in a variety of contexts across the curriculum as mentioned above</li> </ul>

	<b>Data 3 – Representing Data</b>  Which way of presenting data is best for this data set and this audience? How can I be sure that the data in the media is unbiased?		
	<ul style="list-style-type: none"> <li>➤ Averages and range</li> <li>➤ Presenting data</li> <li>➤ Bar charts</li> <li>➤ Pie charts</li> <li>➤ Stem and leaf diagrams</li> <li>➤ Cumulative frequency</li> <li>➤ Box plots</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Links to financial topics (e.g. compound)</li> <li>➤ Problem solving skills developed – especially use of diagrams to help (bar modelling)</li> <li>➤ Links to previous fractions unit</li> <li>➤ Underpins several major skills in the GCSE</li> <li>➤ This content is made use of in the following areas: business studies, sciences, psychology, geography, social sciences</li> </ul> <p>1. Personal Development – being data literate</p>
Summer	<b>Shape 4 - Right-angled triangles</b>  Is it possible to find all of the missing sides and angles in a triangle? Why does 'tan' use vocabulary from circles?		
	<ul style="list-style-type: none"> <li>➤ Angles in triangles</li> <li>➤ Labelling triangles</li> <li>➤ Pythagoras' Theorem</li> <li>➤ Sine ratio</li> <li>➤ Cosine ratio</li> <li>➤ Tangent ratio</li> <li>➤ Consolidate angles including those in triangles if required. Pythagoras and trig in right angled triangles.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Links to prior knowledge: indices, surds, similarity, accurate drawing and compass use</li> <li>➤ Pythagoras' theorem and trigonometry are essential skills for studying maths (and further maths) at GCSE and A Level</li> <li>➤ These skills are used in: construction, architecture, physics, design, seismology, civil engineering, oceanography, cartography, acoustics, game design</li> </ul>

			6. Cultural development – understanding mathematics' rich history with contributions from across the globe
<b>Shape 5 – Constructions</b>  What do we use a compass for? How can properties of a circle and rhombus be used to complete accurate drawings?			
<ul style="list-style-type: none"> <li>➤ Constructing triangles</li> <li>➤ Constructing line bisectors</li> <li>➤ Constructing angle bisectors</li> <li>➤ Constructing angles of <math>60^\circ</math>, <math>45^\circ</math> and <math>30^\circ</math></li> <li>➤ Loci</li> </ul>	<ul style="list-style-type: none"> <li>➤ Assessment in this half term follows the marking and feedback policy in the assessment section at the top of this document.</li> <li>➤ Students will be assessed on the content of this unit between 1 and 2 weeks after finishing the unit</li> </ul>	<ul style="list-style-type: none"> <li>➤ Links to year 7 content on measuring angles, using scales, symmetry</li> <li>➤ Links to calculations work in year 7 (needing to multiply, divide to calculate e.g.)</li> <li>➤ Links to earlier year 9 work on trigonometry and Pythagoras</li> <li>➤ Develop ability to reason geometrically</li> <li>➤ Links to year 7 content on measuring angles, using scales, symmetry</li> <li>➤ Links to calculations work in year 7 (needing to multiply, divide to calculate e.g.)</li> <li>➤ Develop ability to reason geometrically</li> </ul>	