Year 7 - Mathematics						
Curriculum intent	By the end of year 7 we want all students to be equipped with the skills and knowledge to solve problems independently. We want them to demonstrate resilience and have confidence in their secure knowledge. Students will have opportunities throughout each topic to culminate their wealth of mathematical strategies. They will be challenged to use them in a vast range of contexts. This will form the foundation they will take through with them to KS4. Through mathematics lessons we promote mathematical thinking to allow all students to achieve their mathematical potential and engage in the study of mathematics. Using a mastery approach to mathematics allows all students to develop their fluency, reasoning and problem solving using the concrete, pictorial, abstract (CPA) approach. As students progress through their learning topics from previous learning with be interleaved into future learning so students develop application and skill links between different areas of mathematics. In year 7 students start their journey with algebraic thinking, students will further develop pattern spotting, and develop a deep understanding of the basic algebraic forms and fundamentals. Much of this work will be developed using physical manipulatives and further their numerical reasoning. Students will then explore further the concepts of equivalence and equality in both algebraic and numerical form, this will link to real life concepts and explore associated topics to apply these skills. As year 7 continues students will explore new areas of mathematics linked to the four operations and fractions allowing students to develop and apply these central concepts to different areas of mathematics, including frequency diagrams, averages and area. Students will develop their application of calculations using formal methods, please refer to our calculation policy for more details. In Term 3 students will build on their KS2 skills to use mathematical equipment to construct and measure increasingly complex diagrams using correct mathematical notation. Students will also cover geometric language, names and properties of triangles and quadrilaterals and names of other polygons and allow students to develop their geometric reasoning. Students will finish the year with reasoning with number, which will review and extend their mental strategies. Students will link this to early work in probability and number proof, developing their ability to justify and reason deductively in both number and algebra.					
Term	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Knowledge	• Sequences • Understand and use algebraic notation • Equality and Equivalence	• Place value and ordering integers and decimals • Fraction, decimal and percentage equivalence	• Solve problems with addition and subtraction • Solve problems with multiplication and division	• Operations and equations with directed number • Addition and subtraction of fractions	• Constructing, measuring and using geometric notation • Develop geometric reasoning	• Developing number sense • Sets and probability • Prime numbers and proof

			• Fraction and percentage of amounts			
Term	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Skills	• Moving between different numerical, graphical and diagrammatic representations • Make and test conjunctures about patterns • Recognise & generate terms. • Use a calculator to check accuracy • Use algebra to generalise the structure of arithmetic • Formulate mathematical relationships • Recognise and use relationships between operations, including inverse operations • Use and interpret formal algebraic notation • Substitute into expressions • Generate terms of a sequence • Produce graphs of linear functions of one variable • Simplify & manipulate algebraic expressions to maintain equivalence	• Use place value for decimals • Understand and use place value for decimals, measures & integers of any size • Use mathematical symbols for equality and inequality • Compare and order any number up to one billion • Describe, interpret and compare the median & range • Use powers of ten in calculations • Write numbers in standard form • Represent decimals and fractions on a number line • Compare quantities using fractions, decimals and percentages • Express one quantity as a fraction of another • Use and interpret simple pie charts • Using diagrams to represent any fraction as a diagram, on a number line	• Use the properties of addition and subtraction, including the associative law of arithmetic • Develop mental strategies for addition and subtraction • Use formal written methods for addition and subtraction, applied to positive integers and decimals • Recognise and use the most appropriate method: mental strategies, formal written or calculator • Solve problems involving perimeter, financial maths, timetables, frequency diagrams • Use the properties of multiplication and division, including the commutative associative laws of arithmetic • Understand and use factors and multiples • Multiply and divide integers and decimals by powers of 10	• Understand and use multiple representations of directed numbers • Perform calculations that cross zero • Complete calculations using all four operators involving direct numbers • Use of a calculator with directed numbers • Evaluate algebraic expressions involving directs numbers • Understand and use two step equations • Explore powers and roots. • Understand representations of fractions • Understand and use equivalent fractions • Convert between mixed numbers and fractions • Add and subtract proper fractions in any form • Add and subtract improper fractions and mixed numbers • Use fractions in algebraic contexts	• Use language and properties precisely to analyse 2D shapes • Use letter and labelling conventions for geometric figures. • Draw and measure line segments • Understand and classify angles • Measure and draw angles up to 180°. • Measure and draw angles between 180° and 360° • Identify parallel and perpendicular lines • Construct triangles using SSS, SAS and ASA • Interpret pie charts using a protractor • Draw pie charts • Understand and use geometric facts including, sum of angles at a point and on a straight line, vertically opposite angles, angles in triangles and quadrilaterals • Solve complex angle problems • Use geometric facts in simple proof	• Know and use mental strategies for addition, subtraction, multiplication and division, including for decimals and fractions • Use factors to simplify calculations • Using estimation as a method for checking mental calculations • Use known number and algebraic facts to derive other facts • Recognise when to use a mental strategy, formal written method or a calculator • Identify sets and create and represent them on Venn diagrams • Understand and use intersection and the union of sets • Know and use the vocabulary of probability • Generate sample spaces for an event • Know the sum of probabilities of all outcomes is 1

	• Use approximation through rounding to estimate answers • Use algebraic methods to solve linear equations with one variable.	• Identify and use equivalent fractions • Understanding fractions as division • Convert fluently between simple fractions, decimals and percentages • Understanding fractions greater than a whole	• Convert between different metric units • Use formal written methods for multiplication and division, applied to positive integers and decimals • Understand and use order of operations • Find fraction and percentage of amounts using mental methods and a calculator • Solve fraction and percentage problems	• Use equivalence to add and subtract decimals, percentages and fractions • Add and subtract simple algebraic fractions.	• Investigate angles in parallel lines	• Calculate the probability of single events • Understand and use the probability scale. • Identify and use factors and multiples • Find common factors and multiples including HCF & LCM • Write a number as a product of its prime factors • Make and test conjectures, using counter examples to disprove a conjecture
Assessments	**MAT 1** – Recognise and continue sequences, find nth term. Understand basic algebraic notation. **MAT 2** – Collecting like terms, understanding the meaning of equality. **MRT HT1**	**MAT 1** – Order numbers using place value, recognise place value in decimals. **MAT 2** – Equation FDP, move fluently between FDP. **MRT HT2**	**MAT 1** – Recognise order of operations, solve problems involving area. **MAT2** – Solve problems involving the mean, solve problems using multiplication and division. **MRT HT3**	• **MAT 1** – Use directed numbers in problems. • **MAT 2** – Add and subtract fractions, including mixed Numbers. **MRT HT4**	• **MAT 1** – To recognise different angles, measure and draw angles. • **MAT 2** – Using basic angles facts **MRT HT5**	• **MAT 1** – Estimate calculations, review confidence with four operations. • **MAT 2** - Use basic probability facts in problems **MRT HT6**
Curiosity	• Work on your IQ and test your pattern spotting skills https://www.intelligencetest.com/questions/pattern-recognition/index.html • Enter the National Cipher Challenge (Oct-Jan)	• Try out some of the UKMT Junior Challenge questions – some students get the chance to enter in Feb!) https://www.interactive-maths.com/ukmt-random-question-generator.html • Investigate palindromes – here's	• If you've been selected for the UKMT Junior Challenge questions – get some extra practice in! https://www.interactive-maths.com/ukmt-random-question-generator.html • You're throwing a birthday party for your friend. What will	• Can you investigate average temperatures across the work, can you find very cold cities/places and compare them to very warm cities/places, Work out the differences • Try to keep practising your negative	• Can you create different 2D and 3D shapes using mini marshmallows and cocktails sticks (ask an adult first!) • Can you make these different triangles re any of them Impossible triangles? https://nrich.maths.org/5923	• Can you sort shapes based on their properties into a Venn diagram? https://mathsframe.co.uk/en/resources/resource/83/sort-shapes-venn • Can you test the hypotheses? https://nrich.maths.org/6033

	https://www.cipherchallenge.org/ • Research the famous Fibonacci sequence. Can you summarise your research in a poster or factsheet? • Try following sequences to solve the game about (app also available) http://gameaboutsquares.com/	a short article to get you started https://nrich.maths.org/2574 • Equivalence pairs – can you get to cards face down Level 5? https://nrich.maths.org/1249 • In newspapers and magazines find fractions decimals or percentages in them and convert all the values you find. • Black history month activities	you do and how much will it cost? • Make a how to use your calculator guide! It will come in helpful for future learning • You're planning an epic journey, use Google Earth to figure out where you will travel, and how far in total you will travel. Can you give distances in cm, m and km?	number skills! https://www.cimt.org.uk/projects/mepres/book7/bk7i15/bk7_15i1.htm & https://www.cimt.org.uk/projects/mepres/book7/bk7i15/bk7_15i2.htm • Can you design a board game which tests your fraction arithmetic? • Pi day activities.	• Use coloured paper and fold (no scissors allowed) to make different polygons! • Investigate and try the ancient Japanese art of Origami Maths challenge Date TBC	• Can you explain why every year must contain at least one Friday the thirteenth? What is the greatest number of Friday the thirteenths that can fall in one year?