Year 8 - Mathematics						
Curriculum intent	By the end of year 8 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 style 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 will be interleaved into future learning so students develop application and skill links between different areas of mathematics. In year 8 students start their journey with a particular focus on the development of Proportion skills. Ratio and scale will focus on the application of various models to apply to fractions and understanding pi as a ratio. This topic will build on prior learning and provide strong grounding for future learning in particular with fractions and percentages where those fundamental skills will be applied to geometry contexts. Much of this work will be developed using physical manipulatives and further their numerical reasoning. As year 8 continues students will look at brackets, equations and inequalities as well as sequences building on their skills acquired in Year 7. Students will go on to look at fractions and percentages and developing their proportional reasoning which underpins the fundamentals across each stand. The particular focus on number sense will allow students to develop mathematical fluency benefitting later in the year when they study angles and area topics. In Term 3 students will explore new areas of mathematics linked to line symmetry and reflection allowing students to develop new concepts of shape and space, to apply further to measures of location later in the term. Students will go onto data handling exploring ways of representing of data and allowing further development of their reasoning with statistics.					
Term	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Knowledge	• Ratio and Scale • Multiplicative Change • Multiplying and dividing fractions	• Working in the Cartesian Plane • Representing Data • Tables and Probability	• Brackets, equations and inequalities • Sequences • Indices	• Fractions and Percentages • Standard Index Form • Number Sense	• Angles in Parallel lines and polygons • Area of Trapezia and circles • Line Symmetry and Reflection	• The data handling cycle • Measures of location
Term	**Autumn 1**	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Skills	• Understand the meaning and representation of	• Work with coordinates in all four quadrants	• Form algebraic expressions • Use directed number with algebra	• Convert fluently between key fractions, decimals and percentages	• Understand and use basic angles rules and notation	• Set up a statistical enquiry • Design and criticise questionnaires

	ratio and ratio notation • Solve problems involving ratios of the form 1:n and proportional problems with m:n • Divide into a given ratio • Express ratios in simplest form and 1:n • Compare ratios and related fractions • Understand pi as the ratio between diameter and circumference • Solve problems involving direct proportion including graphs • Explore conversion graphs • Convert between currencies • Explore relationships between similar shapes • Understand scale factors as multiplicative representations • Draw and interpret scale diagrams • Interpret maps using scale factors and ratios • Represent multiplication of fractions • Multiply a fraction by an integer	• Identify and draw lines parallel to the axes • Recognise and use the line y=x • Recognise and use lines of the form y=kx and link to direct proportion problems • Explore gradient of the line y=kx • Recognise and use lines of the form y=x+a • Explore graphs with negative gradient • Link graphs to linear sequences • Plot graphs of the form y=mx+c • Explore non-linear graphs • Find the midpoint of a line segment • Draw and interpret scatter graphs • Understand and describe linear correlation • Draw and use lines of best fit • Identify non-linear relationships • Identify different types of data • Read and interpret frequency tables • Represent grouped data • Represent continuous data grouped into equal classes	• Multiply out a single bracket • Factorise into a single bracket • Expand multiple single brackets and simplify • Expand a pair or binomials • Solve equations including with brackets • Form and solve equations with brackets • Understand and solve simple inequalities • Form and solve inequalities • Solve equations and inequalities with unknowns on both side • Identify and use formulae, expressions, identities and equations • Generate sequences given a rule in words or algebraic ruler • Find the rule for the nth term of a linear sequence • Adding and subtracting expressions with indices • Simplifying algebraic expressions by multiplying indices • Simplifying algebraic expressions by dividing indices	• Calculate key fractions, decimals and percentages of an amount without and with using a calculator • Convert between decimals and percentages greater than 100% • Calculate percentage increase and decrease using a multiplier • Express one number as a fraction or percentage of another with and without using a calculator • Work with percentage change • Choose appropriate methods to solve percentage problems • Find the original amount given the percentage less than or greater than 100% • Choose appropriate methods to solve complex percentage problems • Investigate positive and negative powers of 10 • Work with numbers greater than 1 in standard form • Work with numbers between 0 and 1 in standard form	• Investigate angles between parallel lines and the transversal • Identify and calculate with alternate, corresponding, co-interior and alternate angles • Solve complex problems with parallel line angles • Construct triangles and special quadrilaterals • Investigate the properties of special quadrilaterals • Identify and calculate with sides and angles in quadrilaterals • Understand and use the sum of interior and exterior angles in any polygon • Calculate missing interior angles in regular polygons • Prove simple geometric facts • Construct angle bisectors and perpendicular bisectors • Calculate the area of triangles, rectangles, parallelograms and trapezia • Calculate the perimeter and area of compound shapes	• Draw and interpret pictograms, bar charts and vertical line graphs • Draw and interpret multiple bar charts • Draw and interpret pie charts • Draw and interpret line graphs • Choose the most appropriate diagram for given data sets • Represent and interpret grouped quantitative data • Find and interpret the range • Compare distributions using charts • Identify misleading graphs • Understand and use the mean, median and mode • Choose the most appropriate average • Find the mean from ungrouped and grouped frequency tables • Identify outliers • Compare distributions using averages and the range

	• Find the product or a pair of any fractions • Divide an integer by a fraction • Divide a fraction by a unit fraction • Understand and use the reciprocal • Divide any pair of fractions • Multiply and divide improper fractions and algebraic fractions	• Represent data in two-way tables • Construct sample spaces for 1 or more events • Find probabilities from a sample space, two-way table and Venn diagrams • Use the product rule for finding the total number of possible outcomes	• Using the addition and subtraction law for indices • Exploring powers of powers	• Compare and order numbers in standard form • Mentally calculate with numbers in standard form • Add, subtract, multiply and divide numbers in standard form • Use calculator to work with numbers in standard form • Understand and use negative and fractional indices • Round numbers to powers of 10 and 1 significant figure • Round numbers to a given number of decimal places • Estimate the answer to a calculation • Understand and use error interval notation • Calculate using the order of operations • Calculate with money • Convert metric measures of length, weight and capacity	• Investigate the area of a circle • Calculate the area of a circle and parts of a circle with and without a calculator • Recognise line symmetry • Reflect shapes in horizontal and vertical lines • Reflect shapes in diagonal lines	
Assessments	• 3 unit assessments	• 2 unit assessments • Term 1 Autumn Assessment	• 3 unit assessments	• 2 unit assessments • Term 2 Autumn Assessment	• 2 unit assessments	• 3 unit assessments • Term 3 Autumn Assessment
Curiosity	• Make a necklace or bracelet. Pick two colour (or more) and stick to a ratio for the colours (e.g. for every red bead there will be 2 yellow beads).	• Battleships! Play a game of battleships with a friend to help you get used to the coordinate grid. Here is an interactive version -	• Photography! Go around your house or your local community and take pictures of the different 2d and 3D shapes you see. Are there any unusual	• COUNTDOWN! Watch the TV programme on E4 or have a go at the numbers round online here - http://happysoft.org.	• Work out how much it would cost to re-carpet a room in your house. This will require you to measure the area of the floor in the room.	• Look at a newspaper (in print or online) and make a note of all the times you see an average referred to in a

	• How golden are you? Apply the golden ratio to your body measurements to see if you are golden!? https://nrich.maths.org/7668 • Make a glass of juice, then work out the ratio of juice to water you used. Think about how you could work this out using measuring equipment. • How does the recipe change? Here are some online questions to help you - https://www.transum.org/Maths/Exercise/Ratio/Recipe.asp . Alternatively, pick a recipe from a cookbook at home and practice changing the measurements based on how many people you would cook for? Go shopping with someone from home and see if you can add up the shopping bill in your head without using your phone/calculator – take some paper! • Get baking! The best way to practice weighing skills is to bake. Try this recipe	https://www.interactive-maths.com/coordinate-battleship-all-four-quadrants-ggb.html • Healthy eating! A real-life example of substitution is substituting unhealthy foods for healthy alternatives. Why not try and substitute some of your snacks this week for something healthy! Here are some suggestions on the Change4Life website - https://www.nhs.uk/change4life/food-facts/sugar/sugar-swaps-for-kids#all-swaps • How many crazy averages facts can you find on the internet? Sort them out into the ones you believe are true and the ones you think are made up – here are some to start you off https://funfactz.com/tags/average/ • Black history month activities	shapes or compound shapes you see? • Have a go at creating a beaker out of straws - https://nrich.maths.org/8847 • Using coloured paper or card cut up lots of different shapes (e.g. squares, triangle and kites) then create a mosaic out of the shapes. • Can you create different 2D and 3D shapes using mini marshmallows and cocktails sticks (ask an adult first!) • Paper folding – make a pyramid out of one piece of paper - https://www.youtube.com/watch?v=yfL_KwJQr5k	uk/countdown/numgame.php • Translate your body and do the Cha Cha slide! The ChaCha slide requires you to carry out a translation. Are there any other dance songs you can think of that requires a transformation? • Have a go at this gym bag problem – does Jo have enough fabric? *Extension: Could you have a go at testing your answer by making the gym bag?* - https://nrich.maths.org/8845 • Pi day activities.	• Look up Vincent Van Gough's 'Starry Night Over the Rhone'. Go to a local canal or river and sit and draw a picture of the landscape – can you draw this picture based on what it would look like in the water? • Symmetrical shapes – have a go at this paper folding activity to ensure you create symmetrical shapes - https://www.mathsisfun.com/activity/shapes-symmetry.html#:~:text=Folding%20Test,is%20a%20Line%20of%20Symmetry • Here are some examples of transformations that take place in real life - https://xceleratemath.com/geometry/transformations - can you think of anymore? • Maths challenge Date TBC	headline. Read some of the articles to see if there are more averages used within the article. • What is your average speed? Practice running the same distance and record your speed each time. Use this video to help you calculate your average speed - https://tutors.com/math-tutors/geometry-help/average-speed-formula . • What's the average house number on your street? Add up the house numbers on your street and try to find the mean, median and range of the numbers – is there a modal number or is this impossible on the same street? • Map skills – practice orienteering in the local area. Here is Etherow Lodge parks orienteering course (10 minute walk from school) - https://gmoa.org.u

	to make cupcakes - https://www.bbcgoodfood.com/recipes/cupcakes . Or why not try something more challenging with this doughnut recipe - https://www.bbcgoodfood.com/recipes/watermelon-doughnuts					k/borough_tamesside/etherow-lodge-park-orienteering/ .