Maths – Year 8		
Autumn Term		
Pupils will have the opportunity to develop the following skills :	Pupils will have the opportunity to develop their knowledge about :	Pupils will learn the following key vocabulary :
 Numbers and the number system – including prime factorisation and standard form Write a number as a product of its prime factors Use prime factorisations to find the highest common factor of two numbers Use prime factorisations to find the lowest common multiple of two numbers Solve problems using highest common factors or lowest common multiples Round numbers to a given number of significant figures Use standard form to write large numbers Use standard form to write small numbers 	 Numbers and the number system – including prime factorisation and standard form Identify and use the prime factorisation of a number Understand and use standard form use the concepts and vocabulary of prime numbers, highest common factor, lowest common multiple, prime factorisation, including using product notation and the unique factorisation theorem round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures) interpret standard form A × 10n, where 1 ≤ A < 10 and n is an integer 	Numbers and the number system – including prime factorisation and standard form Prime, factor, factorisation, standard form, highest common factor, lowest common multiple, product, notation, indices, powers, significant figures
 Calculating – with negative numbers and fractions Subtract a number from a smaller number Add a positive number to a negative number Subtract a positive number from a negative number Add a negative number Subtract a negative number Subtract a negative number Multiply a positive number by a negative number Multiply a negative number by a negative number Divide a positive number by a negative number Divide a negative number by a negative number Divide a negative number by a negative number Square and cube positive and negative numbers Use a scientific calculator to calculate with negative numbers Use a scientific calculator to calculate with fractions, both positive and negative Understand how to use the order of operations including powers Understand how to use the order of operations including roots 	 Calculating – with negative numbers and fractions Calculate with negative numbers Apply the correct order of operations 	Calculating – with negative numbers and fractions Subtract, add, negative, positive, multiply, divide, calculator, scientific, negative, fractions, operations, brackets, indices, order, roots, powers, square, cube

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 Visualising and constructing – enlargement, scale and bearings Use the centre and scale factor to carry out an enlargement with a positive integer scale factor Find the centre of enlargement Find the scale factor of an enlargement Use scale diagrams, including maps Use the concept of scaling in diagrams Interpret plans and elevations Understand and use bearings Construct scale diagrams involving bearings Solve geometrical problems using bearings 	 Visualising and constructing – enlargement, scale and bearings Use and interpret scale drawings Use and interpret bearings Explore ways of representing 3D shapes Explore enlargement of 2D shapes measure line segments and angles in geometric figures, including interpreting maps and scale drawings and use of bearings identify, describe and construct similar shapes, including on coordinate axes, by considering enlargement interpret plans and elevations of 3D shapes use scale factors, scale diagrams and maps 	Visualising and constructing – enlargement, scale and bearings Scale, diagrams, interpret, bearings, 3D, 2D, enlarge, enlargement, scale factor, maps, scaling, plans, elevations, construct, geometrical
 Risk – probability Know and use the vocabulary of probability Understand the use of the 0-1 scale to measure probability List all the outcomes for an experiment, including the use of tables Work out theoretical probabilities for events with equally likely outcomes Know that the sum of probabilities for all outcomes is 1 Apply the fact that the sum of probabilities for all outcomes is 1 	 Risk – probability Understand the meaning of probability Explore experiments and outcomes Develop understanding of probability relate relative expected frequencies to theoretical probability, using appropriate language and the 0 - 1 probability scale record describe and analyse the frequency of outcomes of probability experiments using tables construct theoretical possibility spaces for single experiments with equally likely outcomes and use these to calculate theoretical probabilities apply the property that the probabilities of an exhaustive set of outcomes sum to one 	Risk – probability Risk, probability, chance, evens, impossible, certain, likely, unlikely, fraction, outcomes, percentage, theoretical

 Algebraic proficiency – including factorisation, expressions and formulae Use and interpret algebraic notation, including: a² b in place of a × a × b, coefficients written as fractions rather than as decimals Simplify an expression involving terms with combinations of variables (e.g. 3a²b + 4ab² + 2a² – a²b) Factorise an algebraic expression by taking out common factors Simplify expressions using the law of indices for multiplication Simplify expressions using the law of indices for powers Know and use the zero index Substitute positive and negative numbers into formulae Change the subject of a formula when one step is required Change the subject of a formula when two steps are required 	 Algebraic proficiency – including factorisation, expressions and formulae Understand the concept of a factor Understand the notation of algebra Manipulate algebraic expressions Evaluate algebraic statements use and interpret algebraic notation, including: a²b in place of a × a × b, coefficients written as fractions rather than as decimals understand and use the concepts and vocabulary of factors simplify and manipulate algebraic expressions by taking out common factors and simplifying expressions involving sums, products and powers, including the laws of indices substitute numerical values into scientific formulae rearrange formulae to change the subject 	Algebraic proficiency – including factorisation, expressions and formulae
Spring Term		
Pupils will have the opportunity to develop the following skills :	Pupils will have the opportunity to develop their knowledge about :	Pupils will learn the following key vocabulary :
 Exploring fractions, decimals and percentages Identify if a fraction is terminating or recurring Recall some decimal and fraction equivalents (e.g. tenths, fifths, eighths, thirds, quarters, etc.) Write a terminating decimal as a fraction Write a fraction in its lowest terms by cancelling common factors Use a calculator to change any fraction to a decimal 	 Exploring fractions, decimals and percentages Explore links between fractions, decimals and percentages work interchangeably with terminating decimals and their corresponding fractions (such as 3.5 and 7/2 or 0.375 or 3/8) 	Exploring fractions, decimals and percentages Fraction, decimals, percentage, equivalent, common, convert, terminating, corresponding

Proportional reasoning	Proportional reasoning	Proportional reasoning
 Express the division of a quantity into two parts as a ratio Understand the connections between ratios and fractions Find a relevant multiplier in a situation involving proportion Solve ratio problems involving mixing Solve ratio problems involving comparison Solve ratio problems involving concentrations Understand and use compound units Convert between units of speed Solve problems involving rates of pay Solve problems involving unit pricing 	 Explore the uses of ratio Investigate the connection between ratio and proportion Solve problems involving proportional reasoning Solve problems involving compound units express the division of a quantity into two parts as a ratio; apply ratio to real contexts and problems (such as those involving conversion, comparison, scaling, mixing, concentrations) identify and work with fractions in ratio problems understand and use proportion as equality of ratios express a multiplicative relationship between two quantities as a ratio or a fraction use compound units (such as speed, rates of pay, unit pricing) change freely between compound units (e.g. speed, rates of pay, prices) in numerical contexts relate ratios to fractions and to linear functions 	Ratio, proportion, division, multiplication, quantity, share, split, divide, compare, compound, speed, pricing, rates, pay, scale, mix, concentrations, linear
 Investigating patterns and sequences, including nth term Generate terms of a sequence from a position-to-term rule Find the nth term of an ascending linear sequence Find the nth term of an descending linear sequence Use the nth term of a sequence to deduce if a given number is in a sequence 	 Investigating patterns and sequences, including nth term Explore sequences generate terms of a sequence from either a term-to-term or a position-to-term rule deduce expressions to calculate the nth term of linear sequences 	Investigating patterns and sequences, including nth term Terms, sequence, linear, nth term, rule, positions, substitute, replace
 Angles in parallel lines and polygons Solve missing angle problems involving alternate angles Solve missing angle problems involving corresponding angles Use knowledge of alternate and corresponding angles to calculate missing angles in geometrical diagrams Establish the fact that angles in a triangle must total 180° Establish the size of an interior angle in a regular polygon Establish the size of an exterior angle in a regular polygon Solve missing angle problems in polygons 	 Angles in parallel lines and polygons Explore geometrical situations involving parallel lines Develop knowledge of angles understand and use alternate and corresponding angles on parallel lines derive and use the sum of angles in a triangle (e.g. to deduce and use the angle sum in any polygon, and to derive properties of regular polygons) 	Angles in parallel lines and polygons Geometrical, alternate, corresponding, supplementary/co-interior, angles, polygon, regular polygon, parallel

 Calculating with fractions, decimals and percentages – simple and compound interest, comparing amounts, percentage change Identify the multiplier for a percentage increase or decrease when the percentage is greater than 100% Use calculators to increase an amount by a percentage greater than 100% Solve problems involving percentage change Solve original value problems when working with percentages Solve financial problems including simple interest 	Calculating with fractions, decimals and percentages – simple and compound interest, comparing amounts, percentage change Calculate with fractions Calculate with percentages interpret fractions and percentages as operators work with percentages greater than 100% solve problems involving percentage change, including original value problems, and simple interest including in financial mathematics	Calculating with fractions, decimals and percentages – simple and compound interest, comparing amounts, percentage change Fraction, percentages, multiplier, calculators, interest, value
 Solve problems that require exact calculation with fractions Solving equations and inequalities – including graphical methods Solve linear equations with the unknown on one side when calculating with negative numbers is required Solve linear equations with the unknown on both sides when the solution is a whole number Solve linear equations with the unknown on both sides when the solution is a fraction Solve linear equations with the unknown on both sides when the solution is a fraction Solve linear equations with the unknown on both sides when the solution is a negative number Solve linear equations with the unknown on both sides when the solution is a negative number Solve linear equations with the unknown on both sides when the solution of a connected equation 	 Calculate exactly with fractions Solving equations and inequalities – including graphical methods Solve linear equations with the unknown on one side Solve linear equations with the unknown on both sides Explore connections between graphs and equations find approximate solutions to linear equations using a graph 	Solving equations and inequalities – including graphical methods Graph, linear, equation, balance, solve, fraction, decimal ,negative, positive, intersection, axes, co-ordinates
Summer Term		
Pupils will have the opportunity to develop the following skills :	Pupils will have the opportunity to develop their knowledge about :	Pupils will learn the following key vocabulary :
Calculating space – circles including segments, cylinders, prisms	Calculating space – circles including segments, cylinders, prisms	Calculating space – circles including segments, cylinders,
 Know circle definitions and properties, including: centre, radius, chord, diameter, circumference Calculate the circumference of a circle when radius or diameter is given Calculate the perimeter of composite shapes that include sections of a circle 	 Investigate circles Discover pi Solve problems involving circles Explore prisms and cylinders compare lengths, areas and volumes using ratio notation 	prisms Circles, area, circumference, pi, radius, diameter, units, composite, volume,

 Calculate the area of a circle when radius or diameter is given Calculate the area of composite shapes that include sections of a circle Calculate the volume of a right prism Calculate the volume of a cylinder Compare lengths, areas and volumes using ratio notation Algebraic proficiency – graphs Know that graphs of functions of the form y = mx + c, x ± y = c and ax ± by = c are linear Plot graphs of functions of the form y = mx ± c Plot graphs of functions of the form ax ± by = c Find the gradient of a straight line on a unit grid Find the y-intercept of a straight line Sketch linear graphs Distinguish between a linear and quadratic graph Plot graphs of quadratic functions of the form y = x² ± c Sketch a simple quadratic graph Plot and interpret graphs of piece-wise linear functions in real contexts Plot and interpret distance-time graphs (speed-time graphs) including approximate solutions to kinematic problems 	 calculate perimeters of 2D shapes, including circles identify and apply circle definitions and properties, including: centre, radius, chord, diameter, circumference know the formulae: circumference of a circle = 2πr = πd, area of a circle = πr² calculate areas of circles and composite shapes know and apply formulae to calculate volume of right prisms (including cylinders) Algebraic proficiency – graphs Plot and interpret linear graphs Plot and quadratic graphs Model real situations using linear graphs plot graphs of equations that correspond to straight-line graphs in the coordinate plane identify and interpret graphs of linear functions graphically recognise, sketch and interpret graphs of linear functions and simple quadratic functions plot and interpret graphs and graphs of non-standard (<i>piece-wise linear</i>) functions in real contexts, to find approximate solutions to problems such as simple kinematic problems involving distance and speed 	cylinder, compare, ratio, notation, 2D, 3D, centre, formulae, chord, properties Algebraic proficiency – graphs Linear, graphs, quadratic, plot, coordinate, axes, axis, straight-line, gradients, intercept, sketch, interpret, solutions, approximate, functions
 Risk – frequency trees and Venn diagrams, expected outcomes List all elements in a combination of sets using a Venn diagram List outcomes of an event systematically Use a table to list all outcomes of an event Use frequency trees to record outcomes of probability experiments Construct theoretical possibility spaces for combined experiments with equally likely outcomes Calculate probabilities using a possibility space Use theoretical probability to calculate expected outcomes Use experimental probability to calculate expected outcomes 	 Risk – frequency trees and Venn diagrams, expected outcomes Explore experiments and outcomes Develop understanding of probability Use probability to make predictions apply systematic listing strategies record describe and analyse the frequency of outcomes of probability experiments using frequency trees enumerate sets and combinations of sets systematically, using tables, grids and Venn diagrams construct theoretical possibility spaces for combined experiments with equally likely outcomes and use these to calculate theoretical probabilities apply ideas of randomness, fairness and equally likely events to calculate expected outcomes of multiple future experiments 	Risk – frequency trees and Venn diagrams, expected outcomes Experiments, outcomes, probability, fraction, decimal, percentage, sum, strategies, listing, frequency, Venn diagrams, grids, theoretical, events, possibility space diagrams, expected

Presenti	ing and measuring data	Presenting and measuring data	Presenting and	
Cor Cor Plo Inte	instruct and interpret a grouped frequency table for continuous data instruct and interpret histograms for grouped data with equal class intervals of a scatter diagram of bivariate data terpret a scatter diagram using understanding of correlation	 Know the meaning of discrete data Interpret and construct frequency tables Construct and interpret pictograms, bar charts, pie charts, tables and vertical line charts 	 Know the meaning of discrete data Interpret and construct frequency tables Construct and interpret pictograms, bar charts, pie charts, tables and vert line charts 	Interpret, frequency, grouped frequency, table, scatter graph, histogram, class- interval, grouped, data, set, median, mean, range, mean, statistics, discrete,
 Fin Fin Cal Est 	nd the modal class of set of grouped data nd the class containing the median of a set of data Iculate an estimate of the mean from a grouped frequency table timate the range from a grouped frequency table	 Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data use and interpret scatter graphs of bivariate data recognise correlation 	continuous, correlation, averages, summarise, compare, outliers, population	
• Ana (me	alyse and compare sets of data, appreciating the limitations of different statistics ean, median, mode, range)	Investigate averagesExplore ways of summarising data		
• Cho	oose appropriate statistics to describe a set of data	 Analyse and compare sets of data interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers) apply statistics to describe a population 		