	KS2 National Curriculum prior learning	By the end of the term, students can:	Year 7 Term 1	Year 7 Term 2	Year 7 Term 3	Year 8 Term 1	Year 8 Term 2	Year 8 Term 3	Year 9 Term 1	Year 9 Term 2	Year 9 Term 3
What we want our students to know and remember	*Skills that have taught at KS2 such as addition, subtraction, multiplication and division are further developed at KS3 and additional skills such as a deeper understanding of algebra# are added to ensure students are making effective progress. A scheme of learning has been devised that is personalising learning for each individual student.*	Define the key tier 3 **vocabulary**:	Algebraic, Multiplication, Division, Addition, Subtraction, Expand, Factor, Like, Term, Variable, Unknown, Substitute, Replace, Order, Formula, Place, Value, Digit, Million, Thousand, Hundred, Ten, Tenths, Hundredths, Thousandths, Rounding, Approximating, Directed, Positive, Negative, Value, Zero, Inequality, Operations, Prime, Common, Index, Factorisation, Decomposition, Index, Notation, Power, Base, Square, Cube, Root, Indices, Likely, Unlikely, Impossible, Evens, Certain, Probability, Fraction, Numerator, Denominator, Relative, Experiment, Frequency, Estimate, Predict, Bias, Independent, Dependent, Mutually Exclusive	Multiplication, Division, Decimal, Operation, Context, Round, Appropriate, Convention, Calculator, Function, Machine, Evaluate, Power, Order, Reverse, Inverse, Input, Output, Variable, Equation, Inequalities, Notation, Solve, Multiplier, Constant of proportionality, Ratio, Parts, Share, Equivalent, Simplify, Parts, Share, Equal, Angle, Line, Parallel, Perpendicular, Right angle, Scalene, Isosceles, Equilateral, Quadrilateral, Parallelogram, Rhombus, Kite, Trapezium, Regular, Irregular, Symmetry, Circumference, Diameter, Radius, Point, Triangle, Quadrilateral, Isosceles, Equal, Base Angles, Opposite, Polygon, Transversal, Alternate, Corresponding	Sequence, Term, Increase, Decrease, Pattern, Arithmetic, Linear, Coordinate, X axis, Y axis, Plot, Quadrant, Horizontal, Vertical, Graph, Area, Formula, Triangle, Parallelogram, Perpendicular Height, Calculate, Unit, Net, Face, Cube, Cuboid, Volume, Dimensions, Reflect, Mirror line, Parallel, Rotate, Centre, Clockwise, Anti-clockwise, Angle, Translate, Vector, Frequency, Tally, Bar, Chart, Pictogram, Key, Compound, Dual, Interpret, Mean, Median, Mode, Range, Graphical, Centi, Milli, Kilo, Measures, Length, Capacity, Volume, Mass, Convert	Negative, Positive, Directed, Calculation, Zero, Multiplication, Division, Addition, Subtraction, Round, Significant, Decimal, Operation, Context, Order, Convention, Index, Indices, Square, Cube, Root, Order, Operations, BIDMAS/BODMAS, Bracket, Power, Standard Form, Power, Place Value, Base, Multiple, Factor, Prime, Highest Common Factor, Lowest Common Multiple, Decomposition, Product, Algebraic, , Expand, Factor, Like, Term, Variables, , Equivalent, Numerator, Denominator, Percentage, Compare, Equivalent, Simplify, Lowest, Inequality, Compare, Equivalent, Simplify, Mixed Number, Improper, Percentage, Proportion, Share, Multiplier, Equivalence, Increase, Decrease, Area, Formula, Base,	Equation, Solve, Inverse, Operation, Create, Variable, Negative, Positive, Unknown, Linear, Inequality, Number Line, Integer, Solution Set, Substitute, Integer, Power, Index, Base, Expression, Pattern, Sequence, Rule, nth Term, Substitute, Difference, Relationship, Term, Position, Coordinate, Plot, Parallel, Horizontal, Vertical, Diagonal, Variables, Midpoint, Parallel, Reciprocal, Perpendicular, Midpoint, Equidistant, Coordinate, Quadratic, Cubic, Convert, Linear, Interpret, Distance, Time, Speed, Gradient, Interpret, Speed, Distance, Time, Acceleration, Gradient, Interpret, Linear, Judgement, , Plotting, Correlation, Positive, Negative, Weak, Strong, Proportion, Direct, Related , Calculation, Multiply, Divide, , Indirect, Unitary,	Probability, Fraction, Likely, Unlikely, Impossible, Evens, Certain, Mutually Exclusive, Numerator, Denominator, Outcome, Probability, List, Sample, Efficiency, Fraction, Numerator, Denominator, Relative, Experiment, Frequency, Fraction, Decimal, Estimate, Predict, Bias, Reflect , Mirror, Parallel, Congruent, Rotate, Clockwise, Anti-clockwise, Angle, Congruent, Translate, Vector, Congruent, Enlarge, Similar, Scale Factor, Two-Way, Combine, Construct, Compare, Bar, Compound, Dual, Vertical Line, Pie, Angle, Proportion, Compare, Analyse, Mean, Median, Mode, Range, Judgement, Interpret, Angle, Polygon, Isosceles, Equilateral, Rhombus, Parallelogram, Parallel, Transversal, Alternate, Corresponding	Calculations, Addition, Subtraction, Multiplication, Division, Inverse, Estimation, Approximation, Error Interval, Place Value, Rounding, BIDMAS, Order, Priority, Power, Base, Index, Law, Multiple, Factor, Prime, Highest Common Factor, Lowest Common Multiple, Decomposition, Product, Standard Form, Place Value, Power, Inequality, Small, Large, Compare, Order, Substitute, Integer, Power, Index, Base, Expression, Index, Law, Simplify, Expand, Collect, Variable, Integer, Algebraic, Integer, Bracket, Factorise, Quadratic, Coefficient, Equivalent, Simplify, Fraction, Lowest, Numerator, Denominator, Mixed Number, Improper, Equivalent, Fraction, Numerator, Denominator, Decimal, Percentage, Compare,	Equation, Algebra, Inverse, Balance, Operation, Two-Step, Brackets, Unknown, Solve, Linear, Inequality, Number Line, Integer, Solution Set, Linear, Simultaneous, Variable, Substitute, Value, Check, Proportion, Direct, Related Calculation, Multiply, Divide, Indirect, Unitary, Ratio, Share, Proportion, Value, Equivalent, Simplify, Pattern, Sequence, Rule, nth Term, Substitute, Difference, Relationship, Term, Position, Coordinate, Plot, Parallel, Horizontal, Vertical, Diagonal, Variables, Midpoint, Parallel, Reciprocal, Perpendicular, Midpoint, Equidistant, , Coordinate, Quadratic, Cubic, Roots, Turning Point	Mean, Median, Mode, Range, Frequency, Table, Distribution, Pie, Angle, Degrees, Circle, Time-series, Line graph, Compare, Scatter, Bi Variable, Distribution, Trend, Correlation, Outlier, Sample, Space, Outcome, List, Probability, Two-Way, Table, Venn, Notation, Sort, Circle, Intersection, Tree, Branch, Probability, Unconditional, Mutually Exclusive, Congruent, Similar, Enlargement, Geometric, Scale, Factor, Length, Angle, Translations, Rotation, Mirror line, Vector, Angle, Reflection, Describe, Repeat, Combine, Enlargement, Transformation, Centre, Scale Factor, Volume, Area, Bisect, Compass, Perpendicular, Line, Middle, Arc, Equidistant, Loci, Locus, Distance, Perpendicular, Parallel, Within, Construct, Accuracy

							Height, Perpendicular, Triangle, Parallelogram, Trapezium, Circle, Diameter, Radius, Chord, Diameter, Circumference, Pythagoras, Theorem, Square, Triangle, Right-Angle, Hypotenuse, Length, Area, Formula, Dimensions, Cross Section, Surface Area, Net, Cube, Cuboid, Prism, Triangular	Recipe, Ratio, Parts, Proportion, Share, Simplify, Fraction, Numerator, Denominator, Ratio, Parts, Share, Simplify, Fraction, Numerator, Denominator		Percentage, Calculate, Amount, Multiplier, Reverse, Original, Inverse, Change, Increase, Decrease, Repeat, Circle, Circumference, Area, Diameter, Radius, Radii, Centre, Perimeter, Rearrange, Pi, Pythagoras, Theorem, Hypotenuse, Square, Root, Right-Angled, Triangle, Calculate, Trigonometry, Sine, Cosine, Tangent, Adjacent, Opposite, Surface Area, Prism, Cross Section, Cylinder, Volume, Dimension, Calculate, Circumference, Circle, Corresponding, Alternate, Parallel Line, Angles		
			Recall the **knowledge**:	In Y7 they begin their journey with key number skills that they will have met in KS2, to ensure that the fundamentals are secure. We will then introduce algebraic principles that will set them up for further challenges. We will make sure their general knowledge on Fractions, decimals and percentages are secure. We then begin some basic probability.	We now build on term 1 by using skills of operations to decimals and on a calculator. Ratio is introduced and Shapes (mainly focussing on angles) knowledge for KS2 is recalled and progressed on, with topic like polygons and angles in parallel lines	To finish Y7, they learn of sequences and relate is back to KS2 concepts on straight line graphs and coordinates, building on their KS2 shapes (area and perimeter this time, not angles), and then move these shapes using different transformations. Then finish with data and conversions of units.	In Y8, they start with more recap of basic skills, and develop the skills further to include powers, standard form, and then push onto Pythagoras using their index skills, and Area/perimeter of circles by using their previous knowledge of calculator skills	The previous Algebra skills are now developed further, with more solving equations and inequalities, and manipulating formula. The straight line graph work from before is also built on by including midpoints and parallel lines, even onto quadratics and cubic. This term is finished with graphs applied to real life variations, and more on the ratio topics completed prior	To finish Y8, they improve on their probability work by applying the rules to experiments and theoretical scenarios. More transformations of shapes are to be completed and Data is looked at again, building on the previous topics and now incorporating Tables.	In Y9, they start with adding onto previous rounding skills by learning about estimations, whilst again learning and practising work on algebra and general number skills. Parentages are also covered in more detail, including reverse and change. Understanding of circles, angles and 3D shapes are extended. Trigonometry is introduced for the first time.	Algebra skills are built on further again, by now moving onto aspects such as simultaneous equations. Similar to Y8, ratio and proportion skills or focused on, as well as straight line graphs onto quadratics and Cubic's.	To finish Y9, probability and data are built upon again, with again more of a focus on extracting information from a table, not just given as a list. More Transformations are completed, but we also add in Congruence and similarity of shapes, and how that can link to transformations, as well as being able to prove congruent triangles. Compass constructions are developed at this point.

What we want our students to do												
	Students will be able to practically apply their arithmetic skills to a variety of mathematical topics such as LCM, HCF, FDP, Algebra, Shape, Data, Statistics, Probability, Graphs and Angles.	Demonstrate excellence in these **skills**:	Simplifying Algebraic terms, writing their own algebraic expressions, using formulae, ability to round, clear understanding of operations with negative/decimal/fractional numbers, manipulation of key percentages without a calculator, understanding probability from a given event.	More skills on operations with decimals, understanding of a function machine (linking to the work in the Autumn Term), solving equations, understanding proportionality and then applying that to a ratio question, identifying angle facts from a shape, finding missing angles by using rules in parallel lines or total angles in a polygon	Find missing terms and create a sequence, plotting of coordinates in all 4 quadrants, plotting a straight line graph, area and perimeter of a mixture of 2d shapes, volume of a prism, transform a shape using 1 of 4 methods, understanding the difference between mean, median, mode and range, convert units of measurement	Complex operations with fractions/decimals, understand the rules of BIDMAS, simplify algebraic terms, solve problems on percentages with/without a calculator. Calculate area and perimeter of circles, using Pythagoras to find the hypotenuse, Find the volume and surface area of prisms and more complex 3d shapes	Solve equations and inequalities, find the nth term of a linear sequence, find points and equations of straight lines on a graph, understand the difference between a cubic and quadratic (and a linear) graph, calculate a combination of speed distance and time from a ST graph or a DT graph, share a ratio into multiple parts, understand the difference between direct and inverse proportion	Finding the probability of a given event, finding the probability given another event has occurred, finding the expected number of results based on a probability, finding out averages and spread from a set of data in a table, complete and construct a 2-way table from information given, find missing angles in polygons of any size, find angles in parallel lines, find angles in polygons that are connected to other shapes or straight lines.	Knowing to estimate a question means to use 1SF, solving algebraic problems with indices, prime factorisation, solving questions with operations in on numbers in standard form, collecting like terms in the expansion of brackets, Understanding what type of percentage problem a question is and solving it with/without a calculator, labelling all parts of a circle, knowledge and application of area and circumference of a circle formula, applying Pythagoras' theorem to 2d shapes, applying rules of trigonometry to right angled 2d shapes.	Solving Equations and inequalities that involve multiple steps, solving any type of simultaneous equations, understand the best value product to buy, understanding of direct and inverse proportion, nth term of a linear sequence, understanding a quadratic sequence's pattern, finding the nth term of a quadratic sequence, plotting and understanding aspects of a straight line graph, parallel and perpendicular gradients, midpoints of 2 coordinates, sketching quadratic and cubic graph, drawing accurately quadratic and cubic graphs.	Calculating averages and spread from a data set, calculating average and spread from data in a table, understand different forms of representing data and how to do it, understanding the correlation of a scatter graph, knowing the effect an outlier can have on data, using a sample space to calculate probabilities, placing and extracting data into/from a 2-way table, construct and then calculate probabilities from a Venn diagram and a tree diagram, knowing the difference between similar shapes and congruent shapes, being able to prove 2 triangles are congruent, transform a shape using 1 or more methods, bisect a line, bisect an angle, find the loci of lines and points

Key assessment questions:											
Key assessment questions:				Working in reverse Incorporating simple powers Reason when expressions cannot be simplified Find missing signs or coefficients to make mathematical statements equivalent Link collecting like terms to perimeter of shapes Reasoning whether expressions are fully factorised Work backwards to find what was expanded Use visual representations to expand brackets Working in reverse Repeated variable problems Substitution of more complex values Order of operations reasoning Leading towards other rounded place values Explore what values round to a number Reason why 5 in place value rounds up Exploring calculations with negatives Missing value problems Work backwards to find missing negatives in calculations Uniqueness of prime factorisation Combining powers Effects of repeated root/square/cube operations Clearly reason why	Combinations of operations Working with substitution and replacement Missing number problems Given answers to long multiplication and division find missing digits Reason with the remainders - context of question and as a decimal e.g. r1 is not necessarily 0.1 Link place value to decimal calculations Error spotting and reasoning Find missing digits in a column method or short division methods. Broken calculator problems Interpreting calculator displays within context Exploring more complex calculator functions More complex operations Identifying missing operations when given outputs and inputs Write missing number scenarios for algebraic equations Substitution to check solutions Using equations in context problems Fractional multiplier Work backwards to find missing multipliers and direct proportion values Consider links between fractions, decimals and percentages	Find missing values given the start and end of sequences Explain why terms cannot lie in a sequence (do not need algebra) Identifying missing coordinates that meet criteria (e.g. vertices of shapes) Oracy Given coordinates find line equations that go through the coordinate Error spotting Converting units within area Reason why areas of triangles has a half or divide by 2 Volume of compound cubes/cuboids Use clear reasoning to comment on other student's solutions Describing transformations Describe transformations given no axes Perform two consecutive translations and explore the overall translation Identifying mirror lines that are not parallel to the axis Combining transformations Describe transformations given no axes More complex data sets Working in reverse Calculate averages from graphs such as bar charts Reason errors made due to place value misconceptions Order values	Larger or smaller values Working in reverse Repeated operations Calculator use Missing value problems Work backwards to find missing negatives in calculations Explore what values round to a number Reason why 5 in place value rounds up Reason with over and under estimates Check calculator errors using estimations Link place value to decimal calculations Error spotting and reasoning Find missing digits in a column method or short division methods. Explore the effect of multiplying a square number by a square number Calculate with increasingly large powers (4/5 etc) Begin to identify patterns when powers progress/regress Work with increasingly more challenging combinations of operations work with increasingly larger or smaller values Estimating square roots Rewrite base numbers and indices to create equivalent calculations	Reasoning why some equations may be the odd one out regarding number of steps, coefficients and solutions plus those that can and cannot be solved Calculator use to find solutions Forming an inequality Substituting and re-arrangement in complex formulae. Derive formulae and substitute values as required. Order of operations reasoning Explaining why 2n looks like the two times tables Demonstrate what values lie in two sequences using nth terms Generating simple quadratic terms Begin to comment on the steepness and direction of graphs and their links to equations Label equations given one coordinate Reason clearly about other student solutions Common error in changing the m of y=mx+c and not the +c when trying to find parallel lines Errors in negative numbers, especially when teaching add both together and divide by 2 method Errors when using calculator and substituting in negative numbers,	Exploring real world probabilities Explaining the effects of bias Use equivalent fractions to work out which events are more likely to occur Reason clearly when unequal chance of outcomes Forming an inequality Substituting and re-arrangement in complex formulae. Derive formulae and substitute values as required. Exploring real world probabilities Working with more than two events Anticipating outcomes Linking relative frequency with sampling Combining multiple events Identifying mirror lines that are not parallel to the axis Combining transformations Describe transformations given no axes Use of fractional scale factors Justify when shapes are not similar Considering likelihoods for conditional probability Create a description based on a two-way table Considering likelihoods for conditional probability Create a description based on a two-way table Using averages from graphical representations Reverse average problems Identifying further	Identifying implications of rounding in calculations Reason with over and under estimates Check calculator errors using estimations Large calculations with repeated index laws being used Estimating square roots Rewrite base numbers and indices to create equivalent calculations Explain the rules of indices clearly Complete missing indices to create equivalent expressions Work with HCF and LCM with increasingly larger numbers (e.g. 1777100000 (2019 exam)) Explore Sieve of Eratosthenes Demonstrate factorisation to work out square roots and cube roots of larger numbers. Error spitting and explaining Explain the limitations of standard form on calculators Reason odd one out for numbers in standard form Substituting and re-arrangement in complex formulae. Derive formulae and substitute values as required. Order of operations reasoning	Exploring various representations and methods for equations Applying equations to real-world scenarios Reasoning why some equations may be the odd one out regarding number of steps, coefficients and solutions plus those that can and cannot be solved Forming an inequality Forming simultaneous equations Using picture representations to explore simultaneous equations Differing positive coefficients Identify values that are in direct proportions Find fractional multipliers between values in direct proportion Working with combined ratio Working out lengths in shapes using ratio Create a shopping list using items for best value Plan a charity event with best value and recipes Explaining why 2n looks like the two times tables Demonstrate what values lie in two sequences using nth terms Generating simple quadratic terms Begin to comment on the steepness and direction of graphs and their	Working with more complex data sets Exploring grouped frequency tables Working in reverse Comparing more than two graphs Interpreting data in context to make decisions Correlation vs causation Exploring sample spaces Interpreting more challenging probabilities from diagrams Work backwards to find missing probabilities or values Exploring more than two events Probability experiments Interpreting probability within contexts Explore area changes in similar shapes Similar shapes where two shapes part of a bigger diagram Reason using similar shape lengths and angles to find missing information in triangles Identifying and using similar properties to find similar measures without use of a diagram Identifying mirror lines that are not parallel to the axis Combining transformations Describe transformations given no axes Using volume and area scale factors as a percentage

				Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
				adding zeros does not work Identify misconceptions Work backwards to find decimals or powers of 10 used to give a solution Give fraction examples to support statements about simplifying and equivalency Error spotting Reason why fraction numerator and denominators cannot be decimals Error spotting - focus on misconception of adding/subtracting denominators Find missing numerators or denominators given an answer Given an answer decide on an appropriate question that would have that answer Compare fractions and decimals Reason mathematically when comparing percentages of amounts Explain clear reasons for why probabilities are placed on scale Exploring real world probabilities Explaining the effects of bias Use equivalent fractions to work out which events are more likely to occur Reason clearly when unequal chance of outcomes	How do we know a ratio is fully simplified? Are there any instances where decimals are allowed in a ratio? Reason which method (bar or fraction of amount) is more efficient or effective Construct an accurate triangle given geometric notation Reason clearly using geometric notation Reason with isosceles triangles including understanding the notation and associated base angles Reason whether angle facts are sometimes, always or never true Identifying further methods to improve accuracy of diagrams Reason with isosceles triangles including understanding the notation and associated base angles Reason whether angle facts are sometimes, always or never true Reason with parallel line angles Given descriptions of angles on parallel lines (no diagrams) Reason with parallel line angles to prove angles in a triangle add to 180.	involving different measures Make comparisons using different measures	Work with increasing more challenging values and combinations Clearly reason why adding zeros does not work Identify misconceptions Work backwards to find decimals or powers of 10 used to give a solution Explain the limitations of standard form on calculators Reason odd one out for numbers in standard form Work with HCF and LCM with increasingly larger numbers (e.g. 1777100000 (2019 exam)) Explore Sieve of Eratosthenes Demonstrate factorisation to work out square roots and cube roots of larger numbers. Reason when expressions cannot be simplified Find missing signs or coefficients to make mathematical statements equivalent Link collecting like terms to perimeter of shapes Work backwards to find what was expanded Use visual representations to expand brackets Explain the links between expanding and factorising Reason with factorising Working in reverse	brackets need to be used! Use bar modelling, fractions and written methods to share into ratio Identify values that are in direct proportions Find fractional multipliers between values in direct proportion Consider links between fractions, decimals and percentages How do we know a ratio is fully simplified? Are there any instances where decimals are allowed in a ratio? Use ratios to solve complex problems.(e.g. X has 15 more than Y) Reason which method (bar or fraction of amount) is more efficient or effective	methods to improve accuracy of diagrams Reason with isosceles triangles including understanding the notation and associated base angles Reason whether angle facts are sometimes, always or never true Reason with parallel line angles Given descriptions of angles on parallel lines (no diagrams) Reason with parallel line angles to prove angles in a triangle add to 180.	Reason when expressions cannot be simplified Find missing signs or coefficients to make mathematical statements equivalent Link collecting like terms to perimeter of shapes Working in reverse More complex variables/coefficients/operations Work backwards to find what was expanded Use visual representations to expand brackets Explain the links between expanding and factorising Reason with factorising More complex variables/coefficients/operations Using BIDMAS within fraction calculations Using fractions in combination with integers in larger problems. Fluent with the language difference, product and sum Error spotting and reasoning Using percentages in context, including with money Solving general rules where percentage changes have occurred, but no values have been provided Reason why leaving solutions in terms of Pi or not is best for different	links to equations Label equations given one coordinate Reason clearly about other student solutions Common error in changing the m of y=mx+c and not the +c when trying to find parallel lines Errors in negative numbers, especially when teaching add both together and divide by 2 method Errors when using calculator and substituting in negative numbers, brackets need to be used!	increase/decrease Using volume and area scale factor in context Incorporating scale drawings and bearings

			Linking relative frequency with sampling Combining multiple events			Incorporating simple powers Reasoning whether expressions are fully factorised Use known equivalent FDP to identify more equivalences Compare equivalent FDP within a wider problem Explaining how to tell when a fraction is fully simplified where prime numbers are involved. Work with decimals within a fraction (e.g. the numerator) Work with writing one number as a fraction of another within a larger problem Using BIDMAS within fraction calculations Using fractions in combination with integers in larger problems. Fluent with the language difference, product and sum Error spotting and reasoning Reason mathematically when comparing percentages of amounts Reasoning overall percentage change when two percentage calculations have been made - misconception 10% increase followed by 10% decrease ends up with the original value			scenarios Understanding the order of operations when calculating the area Working backwards Context problems (Pythagoras) Exact calculations (writing as simple roots) Understanding how much information is required to use the trigonometric ratios Contextual problems Working backwards in surface area Reason with parallel line angles Given descriptions of angles on parallel lines (no diagrams) Reason with parallel line angles to prove angles in a triangle add to 180.		

						Explain the benefits of multipliers Working in reverse in trapeziums Compound areas and perimeters Rearranging to find missing dimensions of circles Contextual problems including the tree scenario Compound volume/surface area Exploring cylinder volume Volume and surface area in context Use clear reasoning to comment on other student's solutions					
Disciplinary Rigour		What makes your subject different to other subjects? What are the expectations for students in your subject area in the KS3 National Curriculum?									