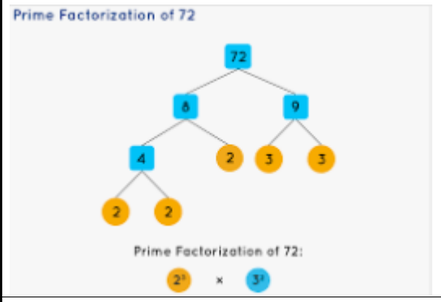
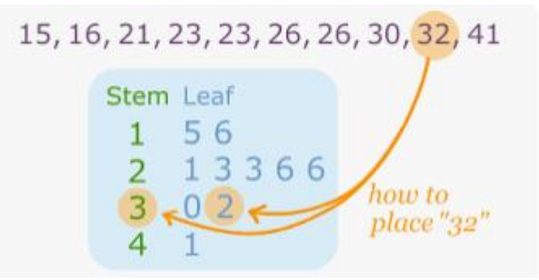
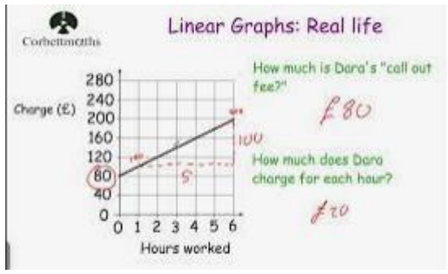
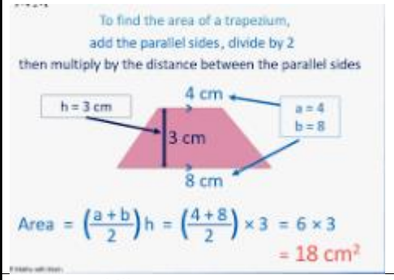
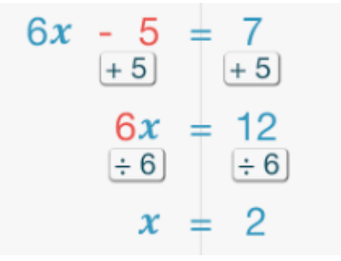
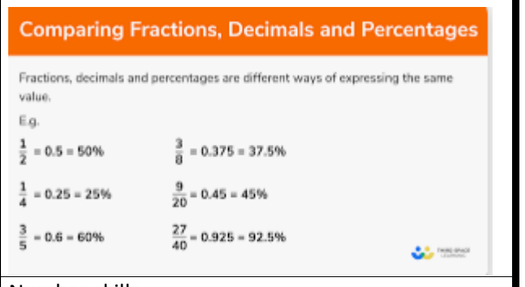
	Year:	8	Subject:	Maths	Autumn 1		Autumn 2		Spring 1	
Intent	**Subject Concepts (Substantive knowledge)** (Key facts and concepts) 	5 Concept areas: 1) Number 2) Algebra 3) Geometry & Measure 4) Statistics & Probability 5) Ratio & Proportion			Unit 1: Number • Division with single digit and two-digit numbers • Order of operations • Squaring and cubing numbers • Inverse of squaring and cubing numbers • Prime factor decomposition	Prior Knowledge: • Mental methods • Calculation methods (+, -, x ÷ • Money & time • Negative numbers • Factors, multiples & prime Takeaway Learning: • Divisibility rules • Calculating with negative numbers • Powers & roots • BIDMAS • Multiples & factors using prime decomposition	Unit 3: Statistics, graphs, and charts • Drawing and interpreting different types of charts • Averages from different types of tables and charts	Prior Knowledge: • Averages from lists & tables • Comparing data • Line graphs & bar charts Takeaway Learning: • Pie charts • Using tables • Stem & leaf diagrams • Scatter graphs • Misleading graphs	Unit 5: Real life graphs • Drawing distance -time graphs • Interpreting distance – time graphs • Plotting types of graphs	Prior Knowledge: • Straight line graphs • Statistical graphs • Reading off system of axes Takeaway Learning: • Conversion graphs • Distance-time graphs • Line graphs • Real-life graphs • Curved graphs
					Unit 2: Area and Volume • Calculating areas of quadrilaterals, including parallelograms and trapeziums • Calculating volume of Cubes and cuboids • Calculating Surface area of basic 3D solids	Prior Knowledge: • Area of squares & rectangles • Counting cm^2 in shapes Takeaway Learning: • Area of triangle, parallelogram & trapezium • Volume of cubes & cuboids • 2D representations of 3D • Surface area of cubes & cuboids	Unit 4: Expressions and equations • Expanding single brackets by a common factor • Solving one step equations • Solving two step equations	Prior Knowledge: • Function machines • Algebraic expressions & simplifying • Writing & substituting into formula Takeaway Learning: • Algebraic powers • Expressions & expanding brackets. • Factorising by common factor • Solve linear equations using balancing method	Unit 6: Decimals and ratio • Ordering decimals • Calculating ratio and proportion with decimals	Prior Knowledge: • Decimals & rounding • Length, mass & capacity • Scales & measures • Working with decimals • Units of measure in area & perimeter • Ratio & proportion with whole numbers Takeaway Learning: • Ordering decimals • Place value calculations • Ratio & proportion with decimals
	Disciplinary Knowledge (Problem solving and reasoning)				Unit 1: Number Students currently working at stage 8. Number and Place Value progression map		Unit 3: Statistics, graphs, and charts Students currently working at stage 8. Statistics progression map		Unit 5: Real life graphs Students currently working at stage 8. Algebra progression map	
					Unit 2: Area and Volume Students currently working at stage 8. Measurement and mensuration progression map		Unit 4: Expressions and equations Students currently working at stage 8. Algebra progression map		Unit 6: Decimals and ratio Students currently working at stage 8. Ratio and Proportion progression map	

Implementation

Common Misconceptions		Unit 1: Number • Many pupils believe that 1 is a prime number – a misconception which can arise if the definition is taken as 'a number which is divisible by itself and 1'. • Some pupils may think 35 934 = 36 to two significant figures • When converting between ordinary and standard form some pupils may incorrectly connect the power to the number of zeros, e.g., $4 \times 10^5 = 400\,000$ so $4.2 \times 10^5 = 4\,200\,000$ • Similarly, when working with small numbers (negative powers of 10) some pupils may think that the power indicates how many zeros should be placed between the decimal point and the first non-zero digit	Unit 3: Statistics, graphs, and charts • Some pupils may label the bar of a histogram rather than the boundaries of the bars. • Some pupils may think that there are gaps between the bars in a histogram. • Some pupils may misuse the inequality symbols when working with a grouped frequency table	Unit 5: Real life graphs • When plotting linear graphs some pupils may draw a line segment that stops at the two most extreme points plotted • Some pupils may think that a sketch is a very rough drawing. It should still identify key features, and look neat, but will not be drawn to scale. • Some pupils may think that a positive gradient on a distance-time graph corresponds to a section of the journey that is uphill. • Some pupils may think that the graph $y = x^2 + c$ is the graph of $y = x^2$ translated horizontally.
		Unit 2: Area and Volume • Some pupils will work out $(\pi \times \text{radius})^2$ when finding the area of a circle. • Some pupils may use the sloping height when finding cross-sectional areas that are parallelograms, triangles, or trapezia. • Some pupils may think that the area of a triangle = base × height • Some pupils may think that you multiply all the numbers to find the volume of a prism. Some pupils may confuse the concepts of surface area and volume	Unit 4: Expressions and equations • Some pupils may think that you always have to manipulate the equation to have the unknowns on the LHS of the equal sign, for example $2x – 3 = 6x + 6$ • Some pupils think if $4x = 2$ then $x = 2$. • When solving equations of the form $2x – 8 = 4 – x$, some pupils may subtract 'x' from both sides.	Unit 6: Decimals and ratio • Many pupils will want to identify an additive relationship between two quantities that are in proportion and apply this to other quantities in order to find missing amounts. • Some pupils may think that a multiplier always has to be greater than 1. • When converting between times and units, some pupils may base their working on 100 minutes = 1 hours
Enabling or Adapting the Curriculum	**SEND Students**	Unit 1: Number Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when comparing data. • Multiplications grids available to support times tables. • Number lines in classrooms to support counting. • Long division templates available in lessons • Short division templates available in lessons • Long multiplication columns and grids available in lessons	Unit 3: Statistics, graphs, and charts Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when comparing data. • Multiplications grids available to support times tables. • Number lines in classrooms to support counting. • Using mathematical equipment (ruler, protractor, calculator etc) • Drawing a straight line • Using a template to draw graphs and charts.	Unit 5: Real life graphs Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when comparing data. • Multiplications grids available to support times tables. • Number lines in classrooms to support counting. • Using mathematical equipment (ruler, protractor, calculator etc) • Drawing a straight line • Using a template to draw graphs and charts.
		Unit 2: Area and Volume Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when comparing data. • Multiplications grids available to support times tables. • Number lines in classrooms to support counting. • Reminders for formulae	Unit 4: Expressions and equations Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when comparing data. • Multiplications grids available to support times tables. • Number lines in classrooms to support counting.	Unit 6: Decimals and ratio Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when comparing data. • Multiplications grids available to support times tables. • Number lines in classrooms to support counting. • Using mathematical equipment • Bar templates available

			• Using mathematical equipment (ruler, protractor, calculator etc)	• Grouping similar items before introducing the idea of collecting like terms and algebra, x, and y • Solving problems with a box indicating missing numbers instead of letters.	• Fraction walls to support proportion.
		Disadvantaged Students	Unit 1: Number Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when answering problem solving questions. • Necessary equipment to support in lessons. • Real world examples to provide context	Unit 3: Statistics, graphs, and charts Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when answering problem solving questions. • Necessary equipment to support in lessons. • Real world examples to provide context	Unit 5: Real life graphs Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when answering problem solving questions. • Necessary equipment to support in lessons. • Real world examples to provide context
			Unit 2: Area and Volume Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when answering problem solving questions. • Necessary equipment to support in lessons. • Real world examples to provide context	Unit 4: Expressions and equations Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when answering problem solving questions. • Necessary equipment to support in lessons. • Real world examples to provide context	Unit 6: Decimals and ratio Lessons and tasks to include: • Scaffolding worksheets to gradually build to independence. • Modelled examples • Sentence starters and writing frames when answering problem solving questions. • Necessary equipment to support in lessons. • Real world examples to provide context
		More Able Students	Unit 1: Number Develop and strengthen understanding using reasoning opportunities and probing questions, for example. • Show me two (three-digit) numbers with the highest common factor of 18. And another. And another… • Show me two numbers with the lowest common multiple of 240. And another. And another… • Jenny writes $7.1 \times 10^{-5} = 0.0000071$. Kenny writes $7.1 \times 10^{-5} = 0.000071$. Who do you agree with? Give reasons for your answer.	Unit 3: Statistics, graphs, and charts Develop and strengthen understanding using reasoning opportunities and probing questions, for example. • Show me a scatter graph with positive (negative, no) correlation. And another. And another. • Kenny thinks that 'frequency diagram' is just a 'fancy' name for a bar chart. Do you agree with Kenny? Explain your answer. • What's the same and what's different: scatter diagram, bar chart, pie chart? • Always/Sometimes/Never: A scatter graph shows correlation	Unit 5: Real life graphs Develop and strengthen understanding using reasoning opportunities and probing questions, for example. • Draw a distance-time graph of your journey to school. Explain the key features. • Show me a point on this line (e.g., y = 2x + 1). And another, and another … • (Given an appropriate distance-time graph) convince me that Kenny is stationary between 10: 00 a.m. and 10:45 a.m.
			Unit 2: Area and Volume Develop and strengthen understanding using reasoning opportunities and probing questions, for example. • Convince me $C = 2\pi r = \pi d$. • What is wrong with this statement? How can you correct it? The area of a circle with radius 7 cm is approximately 441 cm^2 because $(3 \times 7)^2 = 441$. • Convince me that the area of a semi-circle = $\frac{\pi d^2}{8}$ • Name a right prism. And another. And another … • Convince me that a cylinder is not a prism.	Unit 4: Expressions and equations Develop and strengthen understanding using reasoning opportunities and probing questions, for example. • Show me an (one-step, two-step) equation with a solution of -8 (negative, fractional solution). And another. And another … • Show me a two-step equation that is 'easy' to solve. And another. And another … • What's the same, what's different: 2x + 7 = 25, 3x + 7 = x + 25, x + 7 = 7 – x, 4x + 14 = 50? Convince me how you could use graphs to find solutions, or estimates, for equations.	Unit 6: Decimals and ratio Develop and strengthen understanding using reasoning opportunities and probing questions, for example. • Show me an example of two quantities that will be in proportion. And another. And another … • (Showing a table of values such as the one below) convince me that this information shows a proportional relationship. 6 | 9 10 | 15 14 | 21 • Which is the faster speed: 60 km/h or 10 m/s? Explain why.

	Literacy/Numeracy Skills 	**LITERACY** **Reading:**	New vocabulary linked to new concepts. Mathematical reading material once a week for 20 minutes Use of keywords for example: Prime Prime factor Prime factorisation Product Venn diagram Cross-section Cylinder Polygon, polygonal Solid	New vocabulary linked to new concepts. Mathematical reading material once a week for 20 minutes Use of keywords for example: Scale, Graph Axis, axes Scatter graph (scatter diagram, scattergram, scatter plot) Unknown Equation Operation Solve Solution Brackets	New vocabulary linked to new concepts. Mathematical reading material once a week for 20 minutes Use of keywords for example: Linear Substitute Kinematic, Speed, Distance Ratio Proportion Proportional Multiplier
		Writing:	Writing reasoning with correct punctuation & use of mathematical keywords & symbols Example of writing fluency in maths 	Writing reasoning with correct punctuation & use of mathematical keywords & symbols Example of writing fluency in maths 	Writing reasoning with correct punctuation & use of mathematical keywords & symbols Example of writing fluency in maths 
		Oracy:	Incidental language based on ability groups. Example of spoken fluency in maths 	Incidental language based on ability groups. Example of spoken fluency in maths 	Incidental language based on ability groups. Example of spoken fluency in maths 
		NUMERACY	Number skills Numeracy check-up every week Numeracy Ninjas / Maths Box weekly check-up (core, support or extend) & staff to reflect on reasoning	Number skills Numeracy check-up every week Numeracy Ninjas / Maths Box weekly check-up (core, support or extend) & staff to reflect on reasoning	Number skills Numeracy check-up every week Numeracy Ninjas / Maths Box weekly check-up (core, support or extend) & staff to reflect on reasoning
	Digital Strategy 		Unit 1: Number KM: Ben Nevis KM: Astronomical numbers KM: Interesting standard form KM: Powers of ten KM: Maths to Infinity: Standard form Powers of ten film (external site) The scale of the universe animation (external site)	Unit 3: Statistics, graphs, and charts KM: Gathering data KM: Spreadsheet statistics KM: Stick on the Maths HD2: Selecting and constructing graphs and charts KM: Stick on the Maths HD3: Working with grouped data	Unit 5: Real life graphs KM: Plotting graphs KM: Matching graphs KM: Matching graphs (easy) KM: Autograph 1 KM: Autograph 2 KM: The hare and the tortoise
			Unit 2: Area and Volume KM: Circle connections, Circle connections v2 KM: Circle circumferences, Circle problems KM: Circumference searching KM: Maths to Infinity: Area and Volume	Unit 4: Expressions and equations KM: Solving equations KM: Stick on the Maths: Constructing and solving equations NRICH: Think of Two Numbers	Unit 6: Decimals and ratio KM: Proportion for real KM: Investigating proportionality KM: Maths to Infinity: Fractions, decimals, percentages, ratio, proportion

	KM = Kangaroo maths online activity **NRICH = Nrich online activity**	KM: Stick on the Maths: Circumference and area of a circle KM: Stick on the Maths: Right prisms NRICH: Blue and White NRICH: Efficient Cutting NRICH: Cola Can		NRICH: In proportion NRICH: Ratio or proportion? NRICH: Roasting old chestnuts 3 Standards Unit: N6 Developing proportional reasoning
	Home Learning	Unit 1: Number Support, Core and Depth homework tailored to the scheme of work. To scaffold and support for those accessing support homework. Challenge and stretch for those accessing depth homework.	Unit 3: Statistics, graphs, and charts Support, Core and Depth homework tailored to the scheme of work. To scaffold and support for those accessing support homework. Challenge and stretch for those accessing depth homework.	Unit 5: Real life graphs Support, Core and Depth homework tailored to the scheme of work. To scaffold and support for those accessing support homework. Challenge and stretch for those accessing depth homework.
		Unit 2: Area and Volume Support, Core and Depth homework tailored to the scheme of work. To scaffold and support for those accessing support homework. Challenge and stretch for those accessing depth homework.	Unit 4: Expressions and equations Support, Core and Depth homework tailored to the scheme of work. To scaffold and support for those accessing support homework. Challenge and stretch for those accessing depth homework.	Unit 6: Decimals and ratio Support, Core and Depth homework tailored to the scheme of work. To scaffold and support for those accessing support homework. Challenge and stretch for those accessing depth homework.
Impact	**Composite Assessment**	Date:	Date: TBD Content: Autumn assessment • Unit 1: Number • Unit 2: Area and Volume • Unit 3: Statistics, graphs, and charts • Unit 4: Expressions and equations	Date: Content: