Pupils need to show a mastery of a grade descriptor before moving on to harder topics

END OF YEAR 7 – Maths DOUG descriptor				
	2	**4**	**6**	**8**
Number	Be working towards fluency in times tables, place value and division facts. Complete mental arithmetic operations with positive integers. Understand basic representation of fractions.	Fluent times tables, working with time and money. Written methods of calculations with integers, rounding with integers. The beginning of some work with decimals. An understanding of the size of fractions and working with unit fractions to find fractions of amounts.	Extending times table work to include and understanding of factors, multiples, and primes. More confident with decimal work including written methods of multiplication and division with decimals. Adding and subtracting proper fractions, extending to include equivalent representations including percentages.	Confidently working with all four operations with positive, negative and decimal values. Extending fractions work to include improper fractions and mixed numbers.
Ratio and Proportion	Pupils may meet the basics of ratio and proportion in their other topics but will show little in depth understanding of the topic at this stage.	Understand what a ratio is, know that percentages and fractions are different ways of showing the same thing and be able to convert between the two forms.	To fully understand the differences and similarities in ratios and fractions, as well as being able to convert between the two forms. Confident with manipulating ratios to find equivalent ratios and to share amounts in a given ratio – extending into decimal answers and working with units of measure too.	To be able to compare different ratios using the unitary method. To begin to apply their ratio and proportion work to other areas of their maths journey, including scale drawings and direct proportional reasoning. To be able to find percentages of amounts both with and without a calculator.
Algebra	To have a basic understanding that in maths we sometimes us letters to represent	Understand basic algebraic notation. Be able to simplify and substitute with linear terms.	Extend algebraic manipulation work to include non-linear terms as well as be confident	To be able to confidently expand single brackets and combine this with previous

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	unknown numbers. Be able to substitute positive, whole numbers in to simple algebraic expressions and begin to understand the use of a function machine. Be able to plot coordinates in the positive quadrant. Work with simple patterns to extend and describe them	Solve one or two step equations, perhaps relying on manipulatives for support. Be able to describe basic sequences and plot coordinates.	applying the rules of BIDMAS in substitution work, perhaps with the use of some negative numbers too. Begin to understand expanding single brackets. Be able to form basic equations. Be able to plot basic graphs, perhaps building on previous sequences knowledge. Be confident with describing and continuing linear sequences. Use sequences to aid making generalisations in longer problem solving tasks.	knowledge of solving equations. To be able to form equations from both physical and described situations and apply previous knowledge of manipulation to aid solving. To begin to rearrange simple formulae. Graph work is beginning to be more formalised with the ability to calculate the gradient and plot (simple) linear graphs. Sequences work becomes non-linear.
Geometry	Recognise common 2D shapes. Understand what an angle is and apply some key vocabulary. Begin to understand the difference between area and perimeter but rely on counting to calculate this for all but the most basic shapes. Begin to describe shapes based on their (line) symmetry.	Have a basic understanding of angles including how to draw and measure them with accuracy as well as understanding some angle facts. Be able to apply this to constructing basic shapes. A basic understanding of calculating are and perimeter of rectangle's. Understand both line and rotational symmetry without mixing	Have some understanding of angle facts. Be confident in the different recliner area formula, selecting the correct one. Be able to describe shapes in both 2D and 3D using correct mathematical language.	Extend angle knowledge to include facts of parallel and perpendicular lines. Combine previous knowledge to problem solve in new situations, including within shapes and bearings. Extend are and perimeter work to include circles, knowing and applying the correct formulae. Apply their knowledge of shapes to define when things are

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		up the two. Be able to describe and categorise 2D shapes using correct vocabulary.		congruent or similar.
Data	Recognise and use different ways of show data, including pictograms and Carroll diagrams. Be able to make simple statements describing the data, including minimum, maximum and middle. Be able to ask appropriate questions to collect their own data from people using a tally chart to keep record of the answers. Decide which events are more or less likely to happen.	Have a basic understanding of collecting and sorting data. Know how to calculate some measures of location and spread. Begin to make basic interpretations of data and be able to describe the likeliness of an event happening.	Begin to form hypotheses before collecting and representing data in a larger range of ways, including line charts. Understand the different types of data and be able to describe when you might collect each. Extend measure of location to include finding the mean and use this to make more sophisticated interpretations. Begin formalising probability work to include the use of numerical probabilty as well as the difference between experimental and theoretical probability.	Reflect on previous knowledge to understand the data handing cycle and its place in the real world. Begin applying knowledge of measure of spread to larger sets of data represented in ungrouped frequence tables. Be confident with selecting the appropriate calculation for different types of data. Be confident working out probabilities from new situations, including when described using sample space diagrams or possibility trees. Understand mutually exclusive events and the chance of something not happening.

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END OF YEAR 8 - Maths DOUG descriptor				
	2	**4**	**6**	**8**
Number	Fluent times tables, working with time and money. Written methods of calculations with integers, rounding with integers. The beginning of some work with decimals. An understanding of the size of fractions and working with unit fractions to find fractions of amounts.	Be confident working with negative numbers for all 4 operations. Build on the times table fluency to include applying to factors and multiples work. Understand and use an efficient written method for multiplication and division. Have the beginnings of understanding of working with decimals and the relationship between fractions and percentages.	Confidently working with all four operations with positive, negative and decimal values. Extending fractions work to include improper fractions and mixed numbers. Begin understanding the effective use of a calculator.	Extend types of number work to include the beginnings of indicies work as well as applications of prime factors and related calculations. Extend rounding work to significant figures and finding bounds. Understanding the relationships between fractions, decimals and percentages.
Ratio and Proportion	Understand what a ratio is, know that percentages and fractions are different ways of showing the same thing and be able to convert between the two forms.	Work with equivalent ratios and apply their knowledge from the number section to extend to sharing in a given ratio and understanding the relationship between ratios and fractions.	To be able to compare different ratios using the unitary method. To begin to apply their ratio and proportion work to other areas of their maths journey, including scale drawings and direct proportional reasoning. To be able to find percentages of amounts both with and without a calculator.	Extend work on percentages to applying in different situations including increase, decrease and compound interest calculations. Extend proportional reasoning work to include indirect proportion.
Algebra	Understand basic algebraic notation. Be able to simplify and substitute with	Extend algebraic manipulation work to include non-linear terms as well as be	To be able to confidently expand single brackets and combine this	Combine the number work of indicies with algebraic notation and

	linear terms. Solve one or two step equations, perhaps relying on manipulatives for support. Be able to describe basic sequences and plot coordinates.	confident applying the rules of BIDMAS in substitution work. Solving equation work to include unknowns on both sides. Extend sequences work to generating and problem solving from physical situations. Beginnings of graphing work to include describing real work situations.	with previous knowledge of solving equations. To be able to form equations from both physical and described situations and apply previous knowledge of manipulation to aid solving. To begin to rearrange simple formulae. Graph work is beginning to be more formalised with the ability to calculate the gradient and plot (simple) linear graphs. Sequences work becomes non-linear.	formalise algebraic work with the understanding of function notation. Understand basic algebraic proofs and apply previous knowledge to unfamiliar situations. Begin to incorporate knowledge of fractions with algebra. Plot more complicated graphs, including non-linear graphs through the support of substitution.
Geometry	Have a basic understanding of angles including how to draw and measure them with accuracy as well as understanding some angle facts. Be able to apply this to constructing basic shapes. A basic understanding of calculating are and perimeter of rectangle's. Understand both line and rotational symmetry without mixing up the two. Be	Be more confident with basic angle facts. Be able to apply previous knowledge to constructions to triangles. Know and apply the formula for different rectilinear and extend this to compound shapes. Extend knowledge of shapes to 3D descriptions as well as be able to represent these on the 2D page.	Extend angle knowledge to include facts of parallel and perpendicular lines. Combine previous knowledge to problem solve in new situations, including within shapes and bearings. Extend are and perimeter work to include circles, knowing and applying the correct formulae. Apply their knowledge of shapes to define when things are	Know and apply Pythagoras' theorem including in basic geometrical proofs. Be able to use a compass and protractor for formal constructions. Extend work on area to 3D shapes by working out their surface area, perhaps by drawing the nets first. Be able to find the volume of simple 3D shapes. To understand what a vector is an to apply it to

	able to describe and categorise 2D shapes using correct vocabulary.		congruent or similar.	transformations of shapes.
Data	Have a basic understanding of collecting and sorting data. Know how to calculate some measures of location and spread. Begin to make basic interpretations of data and be able to describe the likeliness of an event happening.	Begin to form hypotheses before collecting and representing data in a larger range of ways, including line charts. Understand the different types of data and be able to describe when you might collect each. Extend measure of location to include finding the mean and use this to make more sophisticated interpretations. Begin formalising probability work to include the use of numerical probabilty as well as the difference between experimental and theoretical probability.	Reflect on previous knowledge to understand the data handing cycle and its place in the real world. Begin applying knowledge of measure of spread to larger sets of data represented in ungrouped frequence tables. Be confident with selecting the appropriate calculation for different types of data. Be confident working out probabilities from new situations, including when described using sample space diagrams or possibility trees. Understand mutually exclusive events and the chance of something not happening.	Can extend calculations from frequency tables to include grouped data. Plot and interpret scatter graphs, potentially while linking this to the real world or other subjects. Begin to understand probabilty notation, the use of Venn diagrams and represent information on probabilty trees.

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END OF YEAR 9 - Maths DOUG descriptor				
	2	**4**	**6**	**8**
Number	Be confident working with negative numbers for all 4 operations. Build on the times table fluency to include applying to factors and multiples work. Understand and use an efficient written method for multiplication and division. Have the beginnings of understanding of working with decimals and the relationship between fractions and percentages.	Confidently working with all four operations with positive, negative and decimal values. Extending fractions work to include improper fractions and mixed numbers.	Extend types of number work to include the beginnings of indicies work as well as applications of prime factors and related calculations. Extend rounding work to significant figures and finding bounds. Understanding the relationships between fractions, decimals and percentages.	Be confident working with index laws, including negative indicies. Be understand numbers written in standard form and calculate with them, with and without a calculator. Extend work on bounds to include significant figures and truncation. Know and apply the formulae for compound measures. Decimal work to be extending to include conversions of recurring decimals.
Ratio and Proportion	Work with equivalent ratios and apply their knowledge from the number section to extend to sharing in a given ratio and understanding the relationship between ratios and fractions.	To be able to compare different ratios using the unitary method. To begin to apply their ratio and proportion work to other areas of their maths journey, including scale drawings and direct proportional reasoning. To be able to find percentages of amounts both with and without a calculator.	Extend work on percentages to applying in different situations including increase, decrease and compound interest calculations. Extend proportional reasoning work to include indirect proportion.	Understanding of what exponential growth and decay is, how to calculate it and interpret results in context.
Algebra	Extend algebraic manipulation work to include	To be able to confidently expand single	Combine the number work of indicies with	Manipulation work to include quadratics

	non-linear terms as well as be confident applying the rules of BIDMAS in substitution work. Solving equation work to include unknowns on both sides. Extend sequences work to generating and problem solving from physical situations. Beginnings of graphing work to include describing real work situations.	brackets and combine this with previous knowledge of solving equations. To be able to form equations from both physical and described situations and apply previous knowledge of manipulation to aid solving. To begin to rearrange simple formulae. Graph work is beginning to be more formalised with the ability to calculate the gradient and plot (simple) linear graphs. Sequences work becomes non-linear.	algebraic notation and formalise algebraic work with the understanding of function notation. Understand basic algebraic proofs and apply previous knowledge to unfamiliar situations. Begin to incorporate knowledge of fractions with algebra. Plot more complicated graphs, including non-linear graphs through the support of substitution.	through expanding and factorising. Be able to plot quadratics. Solve linear simultaneous equations by elimination. Apply the distance-time work from number to graphs. Understand how to write the equations of perpendicular and parallel lines through given points. Extend plotting coordinates to the 3D plane.
Geometry	Be more confident with basic angle facts. Be able to apply previous knowledge to constructions to triangles. Know and apply the formula for different rectilinear and extend this to compound shapes. Extend knowledge of shapes to 3D descriptions as well as be able to represent these on the 2D page.	Extend angle knowledge to include facts of parallel and perpendicular lines. Combine previous knowledge to problem solve in new situations, including within shapes and bearings. Extend are and perimeter work to include circles, knowing and applying the correct formulae. Apply their knowledge of shapes to define	Know and apply Pythagoras' theorem including in basic geometrical proofs. Be able to use a compass and protractor for formal constructions. Extend work on area to 3D shapes by working out their surface area, perhaps by drawing the nets first. Be able to find the volume of simple 3D shapes. To understand what	Understand and apply the three trigonometric ratios to basic right-angled triangles, be able to find both angles and missing lengths. Extend work with circles to be able to find arc lengths and sector areas. Be able to apply formulae to find the volume of non-prism shapes including when conversion of units is needed. Be able to

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		when things are congruent or similar.	a vector is an to apply it to transformations of shapes.	transform shapes, including enlarging by fractional and negative scale factors. Be able to prove congruence.
Data	Begin to form hypotheses before collecting and representing data in a larger range of ways, including line charts. Understand the different types of data and be able to describe when you might collect each. Extend measure of location to include finding the mean and use this to make more sophisticated interpretations. Begin formalising probability work to include the use of numerical probabilty as well as the difference between experimental and theoretical probability.	Reflect on previous knowledge to understand the data handing cycle and its place in the real world. Begin applying knowledge of measure of spread to larger sets of data represented in ungrouped frequence tables. Be confident with selecting the appropriate calculation for different types of data. Be confident working out probabilities from new situations, including when described using sample space diagrams or possibility trees. Understand mutually exclusive events and the chance of something not happening.	Can extend calculations from frequency tables to include grouped data. Plot and interpret scatter graphs, potentially while linking this to the real world or other subjects. Begin to understand probabilty notation, the use of Venn diagrams and represent information on probabilty trees.	To understand different methods of sampling and articulate when each should, or shouldn't, be used. Use more sophisticated methods for analysing and interpreting data including two-way tables and stem-and-leaf diagrams. Extend the knowledge of tree diagrams to combine events. Have a more solid understanding of set notation.