Curriculum Map

Subject: Maths

KS3

YEAR 7	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content Knowledge Skills	**Sequences** Describe and continue a sequence given diagrammatically Predict and check the next term(s) of a sequence Represent sequences in tabular and graphical forms Recognise the difference between linear and non-linear sequences Continue numerical linear and non-linear sequences Explain the term to term rule of numerical sequences in words Find missing numbers within sequences **Understand and use algebraic notation** Given a numerical input, find the output of a single function machine Use inverse operations to find the input given the output Use diagrams and letters to generalise	**Place Value and ordering integers and decimals** Recognise the place value of any number in an integer up to one billion Understand and write integers up to one billion in words and figures Work out intervals on a number line Position integers on a number line Round integers to the nearest power of ten Compare two numbers using =, ≠, <, >, ≤, ≥ Order a list of integers Find the range and median of a set of numbers Understand place value for decimals Position decimals on a number line Compare and order any number up to one billion Round a number to 1 sf	**Solving problems with addition and subtraction** Properties of addition and subtraction Mental strategies for addition and subtraction Use formal methods for addition of integers and decimals Use formal methods for subtraction of integers and decimals Solve problems in the context of perimeter Solve financial maths problems Solve problems involving tables and timetables Solve problems with frequency trees, bar charts and line charts Add and subtract numbers given in standard form **Solving problems**	**Operations and equations with directed number** Understand and use representations of directed numbers Order directed numbers using lines and appropriate symbols Perform calculations that cross zero Add and subtract directed numbers Multiplication and division of directed numbers Use a calculator for directed number calculations Evaluate algebraic expressions with directed number Introduction to two step equations Solve two step equations USe order of operations with directed numbers Understand that positive numbers have more than one square root	**Constructing, measuring and using geometric notation** Understand and use letter and labelling conventions including those for geometric figures Draw and measure line segments including geometric figures Understand angles as a measure of a turn Classify angles Measure and draw angles up to 180° Draw and measure angles between 180° and 360° Identify perpendicular and parallel lines Recognise types of triangle and quadrilateral Identify polygons up to a decagon Construct triangles using SSS, SAS and ASA Construct more	**Developing number sense** Know and use mental addition and subtraction strategies for integers Know and use mental multiplication and division strategies for integers Know and use mental arithmetic strategies for decimals and fractions Use factors to simplify calculations Use estimation as a method for checking mental calculations Use known number facts to derive other facts Use known algebraic facts to derive other facts Know when to use a mental strategy, formal written method or a calculator **Sets and**

	number operations Use diagrams and letters with single function machines Find the function machine given a simple expression Substitute values into single operation expressions Find numerical inputs and outputs for a series of two function machines Use diagrams and letters with a series of two function machines Find the function machines given a two step expression Substitute values into two step expressions Generate sequences given an algebraic rule Represent one and two step functions graphically **Equality and Equivalence** Understand the meaning of equality Understand and use fact families, numerically and algebraically Solve one step linear equations involving +/-/x/÷ using inverse operations Understand the meaning of like and unlike terms	Write 10, 100 etc as powers of ten Write positive integers in the form A x 10^n Investigate negative powers of ten Write decimals in the form A x 10^n **Fraction, decimal and percentage equivalence** Represent tenths and hundredths as diagrams and on number lines Interchange between fractional and decimal number lines Convert between fractions and decimals - tenths and hundredths, fifths and quarters, eighths and thousandths Understand the meaning of percentage using a hundred square Convert fluently between simple fractions, decimals and percentages Use and interpret pie charts Represent any fraction as a diagram Represent fractions on number lines Identify and use simple equivalent fractions	**with multiplication and division** Properties of multiplication and division Understand and use factors and multiples Multiply and divide integers and decimals by powers of 10 Multiply by 0.1 and 0.01 Convert metric units Use formal methods to multiply and divide integers and decimals Understand and use order of operations Solve problems using area of rectangles, parallelograms, triangles and trapezia Solve problems using the man Explore multiplication and division in algebraic expressions **Fractions and percentages of amounts** Find a fraction of a given amount Use a given fraction to find the whole and/or other fractions Find a percentage of	Explore higher powers and roots **Addition and subtraction of fractions** Understand representations of fractions Convert between mixed numbers and fractions Add and subtract unit fractions with the same denominator Add and subtract fractions from integers expressing the answer as a single fraction Understand and use equivalent fractions Add and subtract fractions where denominators share a common multiple Add and subtract fractions with any denominator Add and subtract improper fractions and mixed numbers Use fractions in algebraic contexts Use equivalence to add and subtract decimals and fractions Add and subtract simple algebraic fractions	complex polygons Interpret simple pie charts using proportion and using a protractor Draw pie charts **Developing geometric reasoning** Understand and use the sum of angles at a point Understand and use the sum of angles on a straight line Understand and use the equality of vertically opposite angles Know and apply the sum of angles in a triangle and a quadrilateral Solve angle problems using properties of triangles and quadrilaterals Solve complex angle problems Find and use the angle sum of any polygon Investigate angles in parallel lines Understand and use parallel line angle rules Use known facts to obtain simple proofs	**probability** Identify and represent sets Interpret and create Venn diagrams Understand and use the intersection and union of sets Understand and use the complement of a set Know and use the vocabulary of probability Generate sample spaces for single events Calculate the probability of a single event Know that the sum of probabilities of all possible outcomes is 1 **Prime numbers and proof** Find and use multiples Identify factors of numbers and expressions Recognise and identify prime numbers Recognise square and triangular numbers Find common factors of a set of numbers including the HCF Find common multiples of a set of

	Understand the meaning of equivalence Simplify algebraic expressions by collecting like terms, using the ≡ symbol	Understand fractions as division Explore fractions above one, decimals and percentages	a given amount using mental methods and a calculator Solve problems with fractions greater than 1 and percentages greater than 100%			numbers including the LCM Write a number as a product of its prime factors USe a Venn diagram to calculate the HCF and LCM Make and test conjectures Use counterexamples to disprove a conjecture
Key Questions	How is each term in the sequence different from the previous term? How is a linear sequence different from a non linear sequence? What does the expression 6a mean? Are t + 5 and 5 + t always, sometimes or never the same? If you know one addition fact, how many subtraction facts do you know? What's the difference between an equation and an expression?	Why do we round numbers? For a set of integers, is the longest number always the largest number? How do we work out the size of an interval on a number line? Is it possible to find 110% of an amount? What does 100% mean? What does 110% mean? How is a fraction related to a decimal? How is a percentage related to a fraction?	If we know x = y + z, what other addition facts do we know? What subtraction facts do we know? Is the column method always the best way to solve an addition problem? How do you calculate profit? If a = b x c, what other multiplication and division facts do we know? How do you find one-tenth of a number? How do you convert km to m and kg to g? What's the same, what's different?	Why is adding a negative the same as subtracting? What is the difference between -2 squared and (-2) squared? How do we substitute values into an expression? What is the correct order of operations? What is the inverse of multiplication/squaring a number? Does 5 have a square root? How do you know each part is equal when they look different?	How can we measure the size of a turn? How can we describe the direction of a turn? How do you choose which scale to use on a protractor? When are two or more lines parallel? When are two lines perpendicular? When is a polygon regular? What do pie charts show us? Which angle facts do you know? How did you decide which angle facts to	Does multiplication always make a number bigger? Why is estimation useful? How can I change both numbers in a division but keep the answer the same? How many circles or ellipses are needed in a Venn diagram? Do all sets have a complement? Can a probability be 120% why or why not? Does zero have any multiples? Explain the difference between a

			How do you estimate the answer to a decimal multiplication? How can I work out a number if I know a fraction of the number?	How do we find a fraction that is equivalent to a given fraction?	apply? How can you calculate the angle sum of any polygon?	factor and a number When you add together two prime numbers, do they always give an even number?
Assessment	End of topic tests (open book)	End of topic tests (open book) Half term assessment	End of topic tests (open book)	End of topic tests (open book) Half term assessment	End of topic tests (open book)	End of topic tests (open book) End of year assessment
Literacy/numeracy/SMSC/Character	Knowledge organisers for all units of work	Knowledge organisers for all units of work Literacy homework for half term	Knowledge organisers for all units of work	Knowledge organisers for all units of work Literacy homework for half term	Knowledge organisers for all units of work	Knowledge organisers for all units of work
Enrichment opportunities and futures	Junior maths challenge Chess club Maths homework club STEM club					
Year 8	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Content Knowledge Skills	**Ratio and Scale** Understand and use ratio notation Divide a value into a given ratio Express ratios in their simplest integer form, and in the form 1:n Understand π as the ratio between diameter	**Working in the cartesian plane** Work with coordinates in all four quadrants Identify and draw lines that are parallel to the axes Recognise and use lines of the form y =	**Brackets, Equations and Inequalities** Form algebraic expressions Multiply out a single bracket, multiple single brackets and simplify Expand a pair of	**Fractions and percentages** Convert fluently between key F/D/P Calculate key F/D/P of an amount without and with a calculator Convert between decimals and percentages greater	**Angles in Parallel Lines and Polygons** Investigate angles between parallel lines and the transversal Identify and calculate with co-interior, alternate	**The Data Handling Cycle** Set up a statistical enquiry Design and criticise questionnaires Draw and interpret pictograms, bar charts and vertical line charts (R)

	and circumference Understand gradient as a line of ratio (H) **<u>Multiplicative change</u>** Solve problems involving direct proportion Explore conversion graphs and convert between currencies Understand scale factors as multiplicative representations Draw and interpret scale diagrams Interpret maps using scale factors and ratios **<u>Multiplying and dividing fractions</u>** Multiply a fraction by an integer Find the product of a pair of unit fractions and of any fractions Divide an integer by a fraction Divide a fraction by a unit fraction Understand and use the reciprocal Multiply and divide improper and mixed fractions (H) Multiply and divide algebraic fractions (H)	kx, and link to direct proportion problems Explore the gradient of the line y = kx Recognise and use the lines of the form y = x + a Explore graphs with a negative gradient Link graphs to linear sequences Plot graphs of the form y = mx + c Find the midpoint of a line segment **<u>Representing data</u>** Draw and interpret scatter graphs Understand and describe linear correlation and draw and use line of best fit Read and interpret ungrouped and grouped frequency tables Represent data in two way tables **<u>Tables & probability</u>** Construct sample spaces for 1 or more events Find probabilities from a sample space Find probabilities from two-way tables Find probabilities from Venn diagrams Use the product rule for finding the total number of possible	binomials (H) Factorise into a single bracket 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 sides (H) Form and solve equations and inequalities on both sides (H) **<u>Sequences</u>** Generate sequences given a rule in words Generate sequences given a simple algebraic rule Generate sequences given a complex algebraic rule Find the rule for the nth term of a linear sequence (H) **<u>Indices</u>** Adding and subtracting expressions with indices Simplifying algebraic expressions by	than 100% Calculate percentage increase and decrease using a multiplier Express one number as a fraction or percentage of another with and without a calculator Work with percentage change Choose appropriate methods to solve percentage problems Find the original amount given the percentage less than 100% (H) Find the original amount given the percentage greater than 100% (H) Choose appropriate methods to solve complex percentage problems (H) **<u>Standard Index Form</u>** 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 Compare and order	and corresponding angles Solve complex problems with parallel line angles Construct triangles and special quadrilaterals (R) Identify and calculate with sides and angles in special quadrilaterals Understand and use the properties of diagonals of quadrilaterals (H) Understand and use the sum of exterior angles of any polygon Calculate and use the sum of the interior angles in any polygon Calculate missing interior angles in regular polygons Construct an angle bisector (H) Construct a perpendicular bisector of a line segment (H) **<u>Area of Trapezia and Circles</u>** Calculate the area of triangles, rectangles and parallelograms (R) Calculate the area of a trapezium Calculate the	Draw and interpret multiple bar charts Draw and interpret pie charts (R) Draw and interpret line graphs Choose the most appropriate diagram for given set of data Represent and interpret grouped quantitative data Find and interpret the range Compare distributions using charts Identify misleading graphs **<u>Measures of Location</u>** Understand and use the mean, median and mode Choose the most appropriate average Find the mean from an ungrouped frequency table (H) Find the mean from a grouped frequency table (H) Identify outliers Compare distributions using averages and the range

		outcomes (H)	multiplying and dividing indices Using the addition and subtraction law for indices Exploring powers of powers (H)	numbers in standard form Mentally calculate with numbers in standard form Add and subtract numbers in standard form Multiply and divide numbers in standard form Use a calculator to work with numbers in standard form Understand and use negative indices (H) Understand and use fractional indices (H) **<u>Number sense</u>** Round numbers to powers of 10, and 1 significant figure (R) Round numbers to a given number of decimal places Estimate the answer to a calculation Understand and use error interval notation (H) Calculate using the order of operations (R) Calculate with money Convert metric measures of length, weight and capacity Convert metric units of area and volume (H) Solve problems	perimeter and area of compound shapes Investigate the area of a circle Calculate the area of a circle and parts of a circle with and without a calculator **<u>Line Symmetry and Reflection</u>** Recognise line symmetry Reflect a shape in a horizontal or vertical line (shapes touching/not touching the line) Reflect a shape in a diagonal line (shapes touching/not touching the line)	

				involving time and the calendar		
Key Questions	What is the purpose of a ratio? Why are 2:1 and 1:2 different? Can there be more than two amounts in a ratio? Why are factors useful when simplifying the ratio? How do conversion rates relate to ratios? If shapes are not drawn to scale, how can we show they are similar? How does a scale factor compare to a ratio? Why is a scale diagram useful? How is addition related to multiplication? Does multiplying always make numbers larger? How many different ways can you write a quarter of *x*?	How many points lie on the y = x? Why? What effect does increasing/decreasing the value of k have on lines with equations in the form y=kx? What does the gradient of a line represent? Describe the differences between a linear and non-linear graph. How can you tell if correlation is positive or negative? How is correlation useful to us? Why do you need a line of best fit? What does the word frequency mean? What are the equivalent ways of writing a probability?	What is the difference between a term and an expression? Which order do we perform operations when substituting numbers into an expression? Why? What does expand mean when we are working with brackets? What do you look for to find the HCF of a set of terms? How many solutions will the equation have? How many solutions does an inequality have? What would the graph of such a sequence look like? Is it possible for n to take non-integer values? Why or why not? What is the difference between a base and an index?	How do you use the fraction/percentage keys on your calculator? Is it possible to have a percentage greater than 100? How can you order mixed decimals and percentages? If I am multiplying by 0.2 why is this an 80% decrease? What's the difference between profit and loss? Why is it more efficient to write in standard form rather than as an ordinary number? Are negative powers of 10 always, sometimes or never negative numbers? Describe the steps you need to take to multiply/divide a pair of numbers in standard form. What's the same and what's different	How do you know when two or more lines are parallel? How do you identify a pair of corresponding/alternate/co-interior angles? Which quadrilaterals are regular? What are the two conditions that make a polygon regular? Why do we use the perpendicular height when finding the area of a triangle and not the sloping height? Why is it useful to firstly calculate an estimate of the area? Which standard shapes can you identify in the compound shape? Do all regular polygons have lines of symmetry? How do we know how far the vertices of the image are	What is the difference between discrete and continuous data? Why might it be useful to create a multiple bar chart? In which situation is a pie chart/bar chart/line graph the most useful? Why? How can you work out the range? What does the range tell you about a set of data? Is it an average? If you know the mean of a set of numbers, how can you find the total? Is it possible to have 3.9 people in a family? What would be a better average to use? How could you estimate the mean from a table before doing any calculations? Why is our value an estimate of the mean

				about rounding to 1SF and 1DP? Why is it useful to make an estimate before doing a calculation?	from the mirror line?	rather than the exact mean? How do you decide which values are outliers?
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Enrichment opportunities and futures	Junior maths challenge Chess club Maths homework club STEM club					