KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning

Year 8–Term 1 Number properties/Powers/Expressions&Identities/Area&Perimeter

Intent – Rationale

Year 8 begins ensuring students have a secure understanding of number properties to use throughout topics. Their algebra knowledge is developed from Yr7 basics to ensure accurate language and notation is understood. This knowledge is then used in Area and Perimeter problems once they have recapped formula for basic shapes and introduced new formula.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
• Y7 Term 1 Number skills-written methods • Y7 Term 1 Area and perimeter • Y7 Term 2 Algebraic expressions • Y7 Term 2 Equations • Y7 Term 2 Number properties • Y7 Term 3 Calculations • Y7 Term 3 Unit conversions • Y7 Term 3 Circles	• Y8 Term 2 Linear graphs • Y8 Term 4 Forming and solving equations • Y8 Term 4 Circles • Y8 Term 6 Volume • Y8 Term 6 Intro to factorising
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• Design and technology – calculating areas and perimeters for design Science – indices, use of formulae	• Algebraic notation - The use of symbols to represent numbers, developing the understanding that a letter can represent any number. Draw students' attention to the roots of algebra in the Middle East and India. SP2&3, C1 • Number properties - Study of prime numbers as the building block of mathematics can lead to a discussion of the 'mystical' nature of these numbers. Bring in different mathematicians and their careers in time with history. SP2&3, C1

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	• Circles - - An introduction to Pi as an infinite number, link to its use in astronomy. Discussion of the independent discovery of Pi by various cultures and the work carrying on today across the globe investigating this fascinating ratio. SP2&3, C1 • GB4efghi
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
• The Math Book by Clifford Pickover • Alex's Adventure in Numberland by Alex Bellows • Infinity and me by Kate Hosford	• Confidence in understanding various algebraic terminology and notation • Awareness of commonly used formulae in other subjects • Understanding of correct shape terminology

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Mathematics Scheme of Learning
Year 8–Term 1 Number properties/Powers and indices/Expressions&substitutions/Area&perimeter

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?
Know Know first 15 square numbers and roots. Know the first 5 cube numbers and roots. Definition of a prime number. Find the LCM and HCF using lists and prime factorisation, and find HCF and LCM through either pairs or Venn diagram method. Express number in index notation. Multiply and divide in index notation. Simplify expressions using index laws and collecting like terms. Expand single brackets with numerical coefficients or letter. Able to differentiate between an identify, expression, equation or formula. Substitute in to an expression and formula-positive and negative values? Recap calculating the area of rectangles from Y7. Recap calculating the area of triangles from KS2. Use the formula for the area of a parallelogram and trapezium. Calculate the area of compound shapes (including rectangles, parallelograms, trapeziums and triangles). **Apply** Worded problems using LCM and HCF e.g. how many burgers can be made from x buns and y burgers? Form expressions and equations in simplest form Substitute in to formula or expressions with context-positive and negative values? Decimals and fractions? Algebraic representations of perimeter and area (one variable only) **Extend** Worded LCM HCF problems Coefficients and multiple variables used in multiply and divide problems Expanding brackets with letter and number coefficients Finding side lengths when given the area

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What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
Multiply, divide, integer, prime, LCM, HCF, factorise/factorisation, Venn Index, indices, powers, cube, square, root, Simplify, expression, identity, equation, 'like terms', coefficient, substitute, formula, simplest/simplify, variable, expand Rectangle, triangle, parallelogram, trapezium, parallel, quadrilateral, area, perimeter, compound	Lesson • Formative assessment occurs throughout lessons and will address common misconceptions as well as help to inform pace and depth of lesson delivery. Formative assessment will be conducted using a variety of methods as prescribed in the Mathematics Teaching and Learning Protocol. Homework • Retrieval homework issued termly followed by teacher www/ebi comments with a week built in for pupils to digest and follow up on feedback in preparation for retrieval/termly test. • Y8 Homework booklet which contains a mixture of retrieval questions, current topic questions and extension tasks via Junior Maths Challenge questions • Mathswatch assignments Marking • Retrieval homework issued termly followed by teacher www/ebi comments with a week built in for pupils to digest and follow up on feedback in preparation for retrieval/termly test. • Pupils are to self-mark classwork as directed by the teacher. The use of a green marking triangle is encouraged to allow efficient monitoring of pupil progress during book and pupil

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	folder checks which occur termly for each class. Common errors and misconceptions should be addressed as a class. Assessment • A termly assessment will occur with year group 'topic top up' identified in preparation for next term's teaching.

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Number Properties Approx. 3 lessons	Key Knowledge Know Prime numbers, square numbers, square roots and cube roots Find factors and multiples Solve worded problems finding LCM or HCF Be able to do Prime factor decomposition and use to find HCF LCM Common Misconceptions Assumption that 1 is a prime number	Know square numbers for 16-20 (pupils should know 1-15) HCF and LCM problems of 3 numbers	▪ Department powerpoint and folder resources (to be adapted to reflect class requirements) • 'Extension 8' Number N1.2 and N1.3 Useful websites: Mathsbox Goteachmaths AccessMaths CorbettMaths MWB

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	Believing 2 is not a prime number because it is even Confusion between factor and multiple Incorrect completion of Venn diagrams		
Powers and Indices Approx. 3 lessons	<u>Key Knowledge</u> Write a number in index notation Multiply and divide in index notation <u>Common Misconceptions</u> Not recognising that a variable such as x is x^1 and not x^0	Include coefficient of base Include multiple variables	▪ Department powerpoint and folder resources (to be adapted to reflect class requirements) Useful websites: Mathsbox Goteachmaths AccessMaths CorbettMaths MWB

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Expressions and Identities Approx. 4 lessons	<u>Key Knowledge</u> Able to simplify expressions Expand expressions with a single bracket Identify an expression, equation, formula Form an expression and equations Substitute into an expression and formula <u>Common Misconceptions</u> Confusion with a x a = a^2 with a+a = 2a Confusing expressions, equations and formulae Incorrect substitution e.g. 'What is the value of 2a when a =3?'. Pupils may answer 23 rather than 6	Include number and letter coefficients Expansion involving decimals and fractions	• Department powerpoint and folder resources (to be adapted to reflect class requirements) • Simplifying fish puzzle • 'Extension 8' Algebra A2.1 and A4.1 Useful websites: Mathsbox Goteachmaths AccessMaths CorbettMaths MWB

	Incorrect collecting of like terms, especially with multiple single brackets, and in particular with directed number		

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Area and Perimeter Approx. 6 lessons	<u>Key Knowledge</u> Calculate the area of quadrilaterals, triangles and compound shapes Calculate the area of a parallelogram and trapezium Solve mixed area and perimeter problems including algebraic representation Find missing side lengths of given areas <u>Common Misconceptions</u> Confusion between formulae Misidentification of parallel lengths in trapeziums Not using the perpendicular height as required in calculations	Design own compound shapes Use of decimals and fractions	▪ Department powerpoint and folder resources (to be adapted to reflect class requirements) ▪ Area of flags ▪ Zoo project ▪ 'Extension 8' Geometry GM2.1 ▪ 'Extension 8' Algebra A4.1 Useful websites: Mathsbox Goteachmaths AccessMaths CorbettMaths MWB

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Number Properties	R	A	G
Know Prime numbers, square numbers, square roots and cube roots			
Find factors and multiples			
Solve worded problems finding LCM or HCF			
Be able to do Prime factor decomposition and use to find HCF LCM			

Powers and Indices	R	A	G
Write a number in index notation			
Multiply and divide in index notation			

Expressions and Substitution	R	A	G
Able to simplify expressions			
Expand expressions with a single bracket			
Identify an expression, equation, formula			
Form an expression and equation			
Substitute in to an expression and formula			

Area and perimeter	R	A	G
Calculate the area of quadrilaterals, triangles, and compound shapes			
Calculate the area of a parallelogram and trapezium			
Solve mixed area and perimeter problems including algebraic representation			
Find missing side lengths of given areas			