KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning

Year 7 – Term 1/Coding/Number skills/Polygons/Area&Perimeter

Intent – Rationale

Year 7 begins with an extra-curricular topic to build confidence and curiosity in mathematics. Secure number and shape skills are then established in Term 1.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
• KS2 many study WW1&2 may have heard of enigma, some look at binary. Most understand concept of replacing letters with symbols or scrambling. • KS2 number work; students may have a variety in written methods. • KS2 shape – seems less secure since Numeracy strategy. Most can confidently name and have some understanding of angles. • Most can find the area of rectangle, many of a triangle, few of a circle. Many have heard of pi.	• Coding in computing lessons. Year 7 Term 2 basic algebra using letters to represent numbers. • All non-calculator maths! • Year 7 Term 1 area and perimeter, Term 4 angles • Year 7 Term 3 area and perimeter of circles including compound shapes.
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
Art • Appreciation of shape and their properties for creating images Design and Technology • Calculating required area of shapes or perimeter of designs ICT • Coding programmes such as Python Languages	• Coding – M3/BV2/C1/GB4aeghi (discuss the morality of 'breaking' enigma and how in spite of this success the WWII government had to be careful with what information they could use and how loss of life was still allowed to occur)

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• Language patterns in counting numbers Music • Rhythm and counting	
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
• 'Computer Coding Python Projects for Kids: A Step-by-Step Visual – Carol Vorderman and Craig Steele • 'Ada Lovelace Cracks the Code' – Jestine Ware • 'Alex's Adventure in Numberland' - Alex Bellows	• Encouraging use of column multiplication (rather than grid) • Establishing confidence in long division (A level polynomial division) and short division for quick calculations • Correct shape terminology

Mathematics Scheme of Learning
Year 7 – Term 1

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?
National Curriculum references: Consolidate their numerical and mathematical capability from key stage 2 and extend their understanding of the number system and place value to include decimals, extend their understanding of the number system; make connections between number relationships, and their algebraic representations, understand and use place value for decimals, measures and integers of any size, order positive and negative integers, decimals and fractions; use the number line as a model for ordering of the real numbers; use the symbols =, ≠, <, >, ≤, ≥ Derive and apply formulae to calculate and solve problems involving: perimeter and area of triangles, parallelograms, trapezia, volume of cuboids (including cubes) and other prisms (including cylinders), calculate and solve problems involving: perimeters of 2-D shapes (including circles), areas of circles and composite shapes, describe, sketch and draw using conventional terms and notations: points, lines, parallel lines, perpendicular lines, right angles, regular polygons, and other polygons that are reflectively and rotationally symmetric. **Know** The difference between a code and a cipher. Encode and decode a code or cipher.

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<table>
<tr><td colspan="2">Use written methods for the four operations with integers and decimals. Use a calculator.
Know the names and properties of basic polygons. Identify lines of symmetry and order of rotational symmetry.
Find the area and perimeter of basic and compound polygons. Find the area of a shape on a grid.
<u>Apply</u>
Historic codes and ciphers
Number context problems
Area & Perimeter context problems
<u>Extend</u>
Research historic codes and ciphers
Multiplication & division with decimals of different d.p’s
Identify lines of symmetry in unfamiliar shapes.
Estimate the area of complex irregular shapes on a grid (part squares)</td></tr>
<tr><th>What subject specific language will be used and developed in this topic?</th><th>What opportunities are available for assessing the progress of students?</th></tr>
<tr><td>Code, cipher, substitute, shift, decipher, encipher
Integer, multiply, divide, subtract, add, sum, calculate, work out, column multiplication, place value, long division, short division, decimal, multiple, decimal point, negative number, positive, directed numbers, number line,
Square, rectangle, parallelogram, rhombus, kite, quadrilateral, triangle, angle, side, vertices, vertex, edge, polygon, symmetry, line symmetry, order, rotational symmetry, reflection, regular, irregular
Area, perimeter, units, regular, irregular, compound,</td><td>End of term test (not on coding)
Mid Term marking targets

Common misconceptions:
Ciphers are often called a code!
Forgetting to use ‘0’ place holders in column multiplication
Confusion in what to write on ‘top of the bus stop’
Forgetting to bring down the next digit in long division
Calling a rectangle an oblong
Calling a kite a diamond
Encourage ‘multiply’ rather than ‘times’
Encourage ‘subtract’ rather than ‘takeaway’</td></tr>
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Coding	R	A	G
Know the difference between a code and cipher			
Understand how to decode and encode messages using different types of cipher			

Number Skills - written methods	R	A	G
Use written methods to multiply integers			
Use written methods to divide integers			
Understand how to calculate with directed numbers			
Understand how to order, add and subtract decimals			
Understand how to multiply decimals			
Understand how to divide decimals			
Know how to use a calculator			

Polygons	R	A	G
Recognise and know the name of different types of quadrilaterals			
Recognise and know the name of different polygons			
Identify symmetry properties of polygons			

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Area and Perimeter	R	A	G
Understand how to find the perimeter of rectangles and other quadrilaterals			
Understand how to find the area of rectangles and compound shapes			
Understand how to find the area of irregular shapes on a grid			
Solve area and perimeter problems			

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Coding	Know the difference between a code and cipher	Research historic codes and ciphers	Resources printed for you: Coding booklet Coding notebook Caesar shift – make a wheel Pig pen cipher
	Understand how to decode and encode messages using different types of cipher		Scrambled messages
Number skills	Use written methods to multiply integers (column preferred over grid)	Larger numbers – use estimation to check	Y7 Number skills notebook 'The National Curriculum…and beyond' Multiplying in Pairs activity pg15
	Use written methods to divide integers (encourage secure knowledge in long division – prep for alevel)	Larger numbers – use estimation to check	

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	Understand how to calculate with directed numbers	Some have awareness of rules but can't explain – the grid helps this 'Extension 7' – Number N1.2 activities	Multiplication 4 quadrant grid. Complete positive integer multiplication, use sequencing/patterns to complete negative quadrants and form multiply and divide with directed numbers rules
	Understand how to order, add and subtract decimals	Different d.p decimals 'Extension 7' – Number N1.5 activities	'The National Curriculum…and beyond' Decimal Arithmetic pg144-146
	Understand how to multiply decimals	Different d.p decimals	
	Understand how to divide decimals	Different d.p decimals	
	Know how to use a calculator	BIDMAS	Calculated story
Polygons	Recognise and know the name of different types of quadrilaterals	Create a shape sorter/flowchart for deciding shape name	Y7 Polygons notebook
	Recognise and know the name of different polygons	Justifying how know must be a rectangle not a square for example.	Shape sorter games
	Identify symmetry properties of polygons	Unfamiliar shapes	Line and rotational symmetry
Area and Perimeter	Understand how to find the perimeter of rectangles and other quadrilaterals	'Extension 7' – Geometry and measures GM1.1 Length and perimeter activities 'Problem Solved! Book 1' – Two shapes activity pg63	Y7 Area and Perimeter notebook
	Understand how to find the area of rectangles and compound shapes (not circles)	'Extension 7' – Geometry and measures GM1.2 Area activities	

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	Understand how to find the area of irregular shapes on a grid	Estimate with partial squares	'The National Curriculum…and beyond' Approximate areas pg 45, Estimating areas pg46
	Solve area and perimeter problems	'The National Curriculum…and beyond' Higher Level Challenge Section pg64 onwards	