KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning
Year 8 – Term 5/Polygons/Pythagoras/Ratio/Sequences

Intent – Rationale

This term begins with applying and extending pupil knowledge on triangles and quadrilateral angles to any polygon. Year 8 then build on their Year 7 introduction to Pythagoras' theorem to using to solve context problems. They continue to use their maths in context in looking at using Ratio with maps and scale drawings. The final topic revisits finding the nth term of a linear sequence, a topic that students typically struggle to recall; this is in preparation for Year 9 new sequence knowledge. Further pattern sequences will be explored such as matchstick problems.

Sequencing – what prior learning does this topic build upon?	**Sequencing – what subsequent learning does this topic feed into?**
• Year 8 Term 3 angles in triangles, quadrilaterals and in parallel lines • Year 7 Term 6 Pythagoras' theorem, Year 8 Term 1 squares and roots • Year 8 Term 2 direct proportion, Year 7 term 5 simplifying and dividing in a ratio • Year 7 Term 4 nth term of a linear sequence	• Year 9 Term 2 solving compound angle problems e.g. to identify if shapes tesselate • Year 9 Term 3 Pythagoras in 3D and Trigonometry • Year 9 Term 6 direct proportion using constant k • Year 9 Term 5 quadratic and geometric sequences
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
Art • Mathematical ideas of pattern and shape Design and Technology • Ratio calculations Music • Sequences and rhythm, sequences and pattern PSHE • Pythagoras' and other cultures Science • Ratio problems	• GB4e - Focus on sequences and a look at famous sequences such as Fibonacci – an opportunity to discuss mathematicians from other countries. • GB4e and SMSC (C/SO) - Introduction to Pythagoras, link to the importance of Greek mathematical knowledge and its rediscovery during the Renaissance. • GB4e - An early look at proof through investigation and the search for counter examples

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What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	What are the opportunities for developing mathematical skills?
• **How Many Socks Make a Pair? by Rob Eastaway** *Age 13+* Can maths be creative? This book sets out to prove that it can, through a selection of short articles on surprising maths in everyday life. Through lots of intriguing problems, involving card tricks, polar bears and, of course, socks, Rob Eastaway shows shows how maths can demonstrate its secret beauties in even the most mundane of everyday objects. • What's Your Angle, Pythagoras? (Charlesbridge Math Adventures) by Julie Ellis and Phyllis Hornung • Pythagoras: Mathematician and Mystic (Greatest Greek Philosophers) by Louis C Coakley and Dimitra Karamanides	• Stress importance of sketching right angled triangle and labelling for context problems to prepare for complex problems at GCSE • Students commonly struggle with map scales failing to recognise they can be used for any units. Include examples with mixed units

Mathematics Scheme of Learning
Year 8 – Term 5

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

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Know

Recall angles in parallel lines, triangles and quadrilaterals. Calculate the interior and exterior angle of any polygon.
State Pythagoras' theorem and label accurately the sides of a right-angled triangle. Use Pythagoras' theorem to find the length of the hypotenuse and shorter sides.
Express a ratio in its simplest form and in the form 1:n. Divide amounts in a given ratio and calculate totals when part of a ratio is known.
Find the term-to-term rule, use to find the next term in a sequence. Find the nth term of a sequence and use to find any term in a sequence.

Apply

Calculate the number of sides of a polygon when the exterior is known.
Use Pythagoras' theorem to solve context problems.
Solve ratio context problems. Using map scales – link back to bearings work.
Create a numerical sequence from a pattern problem

Extend

Goal-less angle problems
Relate to bearings problems
Map work – create a scale diagram
Pattern problems with two variables e.g. black and white tiles

What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
• Parallel, regular polygon, irregular polygon, interior, exterior, sum, tesselate, Pythagoras' theorem, hypotenuse, right-angled triangle, exact form, simplify, term, term-to-term rule, nth term, arithmetic sequence, linear sequence	• Mid-term target questions • End of half term topics test

Angles in Polygons	R	A	G
Recall angles in parallel lines, triangles and quadrilaterals			

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Calculate the interior angle of any polygon			
Calculate the exterior angle of a polygon			
Calculate the number of sides of a polygon when the exterior is known			

Pythagoras	R	A	G
State Pythagoras' theorem and label accurately the sides of a right-angled triangle			
Use Pythagoras' theorem to find the length of the hypotenuse			
Use Pythagoras' theorem to find the length of one of the shorter sides			
Use to solve context problems			

Ratio	R	A	G
Express a ratio in its simplest form and in the form 1:n			
Form a ratio			
Divide amounts in a given ratio			
Find the total amount when part of a ratio is known			
Use and interpret map scales			

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Sequences	R	A	G
Find the term-to-term rule, use to find the next term in a sequence			
Find the nth term of a linear sequence			
Use the nth term to find any term in a sequence			
Solve sequence pattern problems			

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Angles in Polygons	Recap angles in parallel lines, triangles and quadrilaterals. Calculate the interior and exterior angle of any polygon.		HRE Y8 Angles in Polygons PPT T:\Departments\Curriculum\Maths\2019-20\KS3\Year 8 resources\Term 5 resources\Angles
	Calculate the number of sides of a polygon when the exterior is known. Angle problems	Goal-less angle problems Forming and solving algebra problems with missing angles	
Pythagoras	State Pythagoras' theorem and label accurately the sides of a right-angled triangle. Use Pythagoras' theorem to find the length of the hypotenuse	Two step problems Finding the hypotenuse when given the area of a triangle Worded problems	HRE Y8 Pythagoras PPT T:\Departments\Curriculum\Maths\2019-20\KS3\Year 8 resources\Term 5 resources\Pythagoras

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	Use Pythagoras' theorem to find the length of one of the shorter sides	Finding the length of a shorter side given the area of a triangle Worded problems	Pythagoras's Theorem covered via remote learning in Y7. Finding hypotenuse or a shorter side covered but not in context problems.
	Real life problems	Relate to bearings problems	Enforce students sketching and labelling diagram when one is not given.
Ratio	Express a ratio in its simplest form and in the form 1:n. Form a ratio.	Include 3 variables	HRE Y8 Ratio PPT
	Divide amounts in a given ratio	Include 3 variables. Problems where a decision is to be made.	Dividing in a given ratio covered via remote learning in Y7.
	Find the total amount when part of a ratio is known	Problems where a decision is to be made e.g. can he make? Does he have enough?	
	Use and interpret map scales	Map work – create a scale diagram	T:\Departments\Curriculum\Maths\2019-20\KS3\Year 8 resources\Term 5 resources\Ratio
Sequences	Find the term-to-term rule, use to find the next term in a sequence. Generate a sequence using the nth term.	Algebraic sequences	HRE Y8 Sequences PPT T:\Departments\Curriculum\Maths\2019-20\KS3\Year 8 resources\Term 5 resources\Sequences
	Find the nth term of a linear sequence. Use the nth term to find any term in a sequence		
	Solve sequence pattern problems	Pattern problems with two variables e.g. black and white tiles	