Mathematics Scheme of Learning

Year 9 – Term 5/Sequences/Volume and SA/Percentages/Inequalities

<u>Intent – Rationale</u>

Students build on knowledge from Year 8 to use in real life contexts with increased frequency in preparation for GCSE problems where knowledge will need to be combined and applied. Students will explore simple and compound interest with discussion on bank interest rates and personal finances.

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
 Year 8 Term 5 generating simple arithmetic sequences, finding the nth term. (HSL) Year 8 Term 6 finding the V and SA of prisms. Term 1 Y9 area and perimeter of compound shapes. (HSL) Year 8 Term 3 using multiplies for % change Year 7/8 place value, Year 9 Term 1 solving linear equations, Year 9 Term 4 drawing straight line graphs. 	 GCSE generating linear/quadratic sequence to solve problems. Recognise geometric sequences and find the next term. At GCSE V and SA of cones, spheres & pyramids. Problems such as using V to find rate of flow. Compound measure problems D/M/V and P/F/A GCSE repeat % change problems simple vs compound interest GCSE represent multiple inequalities graphically and identify integers which meet conditions given.
What are the links with other subjects in the curriculum?	What are the links to SMSC, British Values and Careers?
Design and Technology	• SP2&3, C1
Percentage calculations	• GB4efghi
 Volume and surface area of products 	• SMSC (SO) Work on percentages can lead to a discussion of
Music	money lending and rates of interest.
 Sequences and rhythm, sequences and pattern 	
Science	
 Calculations with volume and percentages 	
 Use of known/given formulae 	

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' - Clifford Pickover 'Alex's Adventure in Numberland' - Alex Bellows 'On the Job: First Responders: Expressions, Equations and Inequalities – Vickie An 	 Use of tables for systematic working to generate a sequence for a problem Using real life objects to find SA and V Best buys using percentage change

Mathematics Scheme of Learning

<u>Year 9 – Term 5</u>

Intent – Concepts

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

National Curriculum 2014 Programme of Study Reference

Generate terms of a sequence from either a term-to-term or a position-to-term rule. Recognise arithmetic sequences and find the nth term. Recognise geometric sequences and appreciate other sequences that arise.

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. Use the properties of faces, surfaces, edges and vertices of cubes, cuboids, prisms, cylinders, pyramids, cones and spheres to solve problems in 3-D work interchangeably with terminating decimals and their corresponding fractions (such as $\frac{7}{2}$ and 3.5 or 0.375 and $\frac{3}{8}$). Define percentage as 'number of parts per hundred', interpret percentages and percentage changes as a fraction or a decimal, interpret these multiplicatively, express one quantity as a percentage of another, compare two quantities using percentages, and work with percentages greater than 100%. Interpret fractions and percentages as operators Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors

<u>Know</u>

Finding the nth term of an arithmetic sequence and a quadratic sequence. Explore other sequences e.g. n³ + 1. Recap find the area and perimeter of basic shapes. Calculate the volume of prisms including cylinders and compound prisms (not spheres, cones, pyramids). Calculate the surface area of a cylinder.

Recap using multipliers to calculate percentage change. Reverse p	percentages with emphasis on language used to identify. Calculate		
compound interest and repeat percentage change.			
Represent an inequality on a number line	and graphically. Solve a linear inequality.		
Ap	ply		
Generate a seque	nce from a picture.		
Solve problems to find missing dimensior	is when given the volume or surface area.		
Personal	finances.		
Form an inequality to rep	resent a worded problem.		
Ext	end		
Form hypothesis and develop further questions to support an	Form hypothesis and develop further questions to support an investigation where a sequence has been formed to generalise.		
Use the volume to solve problems such a	as in compound measures or rate of flow.		
Able to identify opportunities to use p	ercentage change to manage finances.		
Identify a region to represent r	nultiple inequalities on a graph.		
What subject specific language will be used and developed in this	What opportunities are available for assessing the progress of		
topic?	students?		
Arithmetic, geometric, quadratic, nth term, term-to-term, area,	 Investigative problem generating a quadratic sequence 		
Arithmetic, geometric, quadratic, nth term, term-to-term, area, surface area, compound, cross section, prism, circumference,	 Investigative problem generating a quadratic sequence Discussion of changing dimension and effect on SA and V, 		
Arithmetic, geometric, quadratic, nth term, term-to-term, area, surface area, compound, cross section, prism, circumference, diameter, radius, multiplier, simple interest, compound interest,	 Investigative problem generating a quadratic sequence Discussion of changing dimension and effect on SA and V, 'goalless' problems 		
Arithmetic, geometric, quadratic, nth term, term-to-term, area, surface area, compound, cross section, prism, circumference, diameter, radius, multiplier, simple interest, compound interest, depreciates, decay, original amount, percentage change	 Investigative problem generating a quadratic sequence Discussion of changing dimension and effect on SA and V, 'goalless' problems Use of mini whiteboards recapping multipliers. Best buy tasks 		
Arithmetic, geometric, quadratic, nth term, term-to-term, area, surface area, compound, cross section, prism, circumference, diameter, radius, multiplier, simple interest, compound interest, depreciates, decay, original amount, percentage change	 Investigative problem generating a quadratic sequence Discussion of changing dimension and effect on SA and V, 'goalless' problems Use of mini whiteboards recapping multipliers. Best buy tasks 		
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Sequences	R	А	G
Finding the nth term of an arithmetic			
Finding the nth term of a quadratic			
Other special sequences			
Generating sequences from pictures			

Volume & Surface Area	R	А	G
Perimeter, area and volume of basic shapes			
Calculate the volume of Prisms			
Work out the surface area of cylinders			
Work out the volume of a compound Prisms			

Percentages	R	А	G
Use multipliers to calculate a percentage change			
Reverse percentages – find the original amount			
Calculate compound Interest			
Understand Personal Finances			

Inequalities	R	А	G
Represent an inequality on a number line			
Solve linear inequalities			
Represent an inequality graphically			

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Sequences	Finding the nth term of an	Non-numerical sequences	Starter Activity
	arithmetic	Simultaneous equations with	Textbook P115- 117
		linear sequences	NB Y9 Sequences PPT

	Finding the nth term of a quadratic	Worded problems	Increasingly Difficult Problems Solved by differences and then moving from quadratic to linear combinations (NOT P211) Textbook P120
	Other special sequences	Research project	Game for paired work - other sequences Generating Sequences
	Generating sequences from pictures		Painted Cubes Investigation Textbook P117-120
Volume and Surface Area	Recap perimeter, area and volume of basic shapes	Algebraic questions	NB Y9 Volume and Surface Area PPT Textbook P184-185 Problem Solving P185-188
	Cylinders, and prisms	Working backwards to find a missing dimension Algebraic questions	Problem on Surface Area Volume snakes and ladders
	Surface area of cylinders	Working backwards to find a missing dimension Algebraic questions	Surface area and volume
	Compound Prisms		Textbook P194-197 (Not Cones or Pyramids)
Percentages	Refresh multipliers		NB Y9 Percentages PPT Textbook P139-141
	Reverse percentages	Worded questions	Textbook P142-144 Mixed Qs P144-145
	Compound Interest	Calculating the interest rate	Compound interest treasure hunt
	Personal Finances	Research project	Bank interest cards https://pixabay.com/photos/money- finance-mortgage-loan-2696229/

			Where is the maths PP slide 6 Natwest banking resources - KMB
Inequalities	Represent an inequality on a number line		NB Y9 Inequalities PPT
	Solving Linear Inequalities	Worded problems	
	Represent an inequality graphically		Acetate overlays of regions-KMB