KESTEVEN AND SLEAFORD HIGH SCHOOL

Mathematics Scheme of Learning
Year 10 – Term 4

Intent – Rationale

"Maths is for everyone". AQA GCSE Mathematics is designed to be diverse, engaging and essential to equip all students with the skills and knowledge to reach their future destination. Opportunities to make connections, generalise and apply are embedded where appropriate for each individual student. References to careers and future learning and shared with students.

Sequencing – what prior learning does this topic build upon?	**Sequencing – what subsequent learning does this topic feed into?**
• Year 9 Term 3 basic index laws (not negative or fractional) • Year 9 Term 3 writing values in standard form and calculations • Year 9 Term 6 simplifying surds • Year Term 3 substitution, changing the subject • Year 9 Term 3 solving algebraically, Term 4 graphically	• A level calculus requires expressions to be written in index notation • GCSE and A level exact calculation requires simplifying surds • A level substitution in to further formula such as SUVAT, and function notation is used more regularly. • A level solving vector problems using simultaneous equations
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• Standard Form is used in Science & Geography • Surds may be used for exact calculations in technical drawings • Links with simultaneous equations may be seen in Science	SP2&3, C1 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?**

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• Understanding of language used in worded problems. • Reasoning and drawing of conclusions	• Working in exact forms with surds and standard form. • Application to real life contexts • Links between topics

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Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?
Know Recall square numbers 1-15 and cube numbers 1-5. Recognise powers and roots of any given number. Calculate with roots and with positive integer, negative integers and fractional indices. Express numbers as a power of a given base. Understand and use place value. Express numbers large and small in standard notation and vice versa. Simplify surds to calculate exactly. Recognise and use simple geometric progression (r^n) where *n* is an integer and *r* is a surd. Verify, show and prove identities. Use simple function notation, find composite functions and inverse function using accurate notation. Solve simultaneous equations algebraically and graphically with both linear, and linear & non quadratic equations. **Apply** Solve index notation problems. Solve problems (in context) expressed in standard form notation. Rationalise denominator. (Function notation is applied in graph transformations topic) Set up and solve simultaneous equations for simple processes and situations **Extend** Solve problems with different bases.

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Standard form used in other contexts eg limits of accuracy Surds used in other problems eg proof, exact values. Find composite functions expressed algebraically. Equations which require rearranging before solving simultaneously

What subject specific language will be used and developed in this topic?	**What opportunities are available for assessing the progress of students?**
• List key terminology and definitions	• End of topic homework tests • Exam question practice – open book • Mini quizzes including Kahoot • Recall starters: • LLLWLTLY • Corbett 5 a day • Whiterose maths KS4 problem of the day • Mini quiz on last term topics •

Indices	R	A	G
Learn square numbers 1-15 and cube numbers 1-5. Recognise powers and roots of any given number such as $2^4 = 16$			
Calculate with roots and with positive integer, negative integers and fractional indices			

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Express numbers as a power of a given base. Solve problems in this form.			

Standard Form	R	A	G
Understand and use place value			
Express large numbers in standard form and vice versa			
Express small numbers in standard form and vice versa			
Calculate with numbers in standard form with and without use of a calculator			

Surds	R	A	G
Calculate exactly with surds			
Simplify surd expressions			
Rationalise denominators			
Recognise and use simple geometric progression (r^n) where n is an integer and r is a surd			

Functions	R	A	G
Show, Verify and Prove			
Use simple function notation to evaluate functions			
Find composite functions			
Find inverse functions			

Simultaneous Equations	R	A	G
Solve linear simultaneous equations			
Solve a linear and a quadratic simultaneous equations			

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Find approximate solutions to simultaneous equations using a graph			
Translate simple situations or procedures into simultaneous equations to solve and interpret the solutions			

Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
Indices	Learn square numbers 1-15 and cube numbers 1-5. Recognise powers and roots of any given number such as $2^4 = 16$		Check prior knowledge: code breaker, kahoot quiz Indices, Standard Form & Surds PP
	Calculate with roots and with positive integer, negative integers and fractional indices	Focus on $\left(\frac{25}{16}\right)^{-\frac{1}{2}}$	Address misconceptions $(-3)^2$ and -3^2, $(2x^5)^3$
	Express numbers as a power of a given base. Solve problems in this form.	Solve problems with different bases	
Standard Form	Understand and use place value Express large numbers in standard form and vice versa Express small numbers in standard form and vice versa		Reference to careers Multiple choice problems "which numbers are in standard form" to address misconceptions
	Calculate with numbers in standard form with and without use of a calculator – addition and subtraction		Indices, Standard Form & Surds PP
	Calculate with numbers in standard form with and without use of a calculator – multiply and divide (refer to index laws)	Calculations in other contexts	

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Surds	Calculate exactly with surds		Pythagoras problems
	Simplify surd expressions		Indices, Standard Form & Surds PP
	Rationalise denominators	Calculations such as √2 + (3/√50)	
	Recognise and use simple geometric progression (r^n) where *n* is an integer and *r* is a surd		
Functions	Show, Verify and Prove		Proof puzzles Proof PP
	Use simple function notation to evaluate functions		Functions PP
	Find composite functions	Algebraic composite function problems. Solve composite function equations	
	Find inverse functions		
Simultaneous equations	Solve linear simultaneous equations	Equations which need to be rearranged first	Simultaneous Equations PP
	Solve a linear and a quadratic simultaneous equations		
	Find approximate solutions to simultaneous equations using a graph		
	Translate simple situations or procedures into simultaneous equations to solve and interpret the solutions		