KEVICC Key Stage 4 Curriculum Subject: Mathematics	Key Vocabulary and notation.

Spring Half-Term

Term: Year 11 Spring Term – Block Three	Topic: Further Sketching Graphs

What is the essential knowledge from this unit?
What do students need to remember and understand?

	Specification content	Specification notes
A14	Plot and interpret graphs (<u>including reciprocal graphs</u> **and exponential graphs**) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematics problems involving distance, speed, and acceleration	including problems requiring a graphical solution

Students should be able to:
- plot a graph representing a real-life problem from information given in words, in a table or as a formula
- identify the correct equation of a real-life graph from a drawing of the graph
- read from graphs representing real-life situations; for example, work out the cost of a bill for so many units of gas or the number of units for a given cost, and also understand that the intercept of such a graph represents the fixed charge
- interpret linear graphs representing real-life situations; for example, graphs representing financial situations (eg gas, electricity, water, mobile phone bills, council tax) with or without fixed charges, and also understand that the intercept represents the fixed charge or deposit
- plot and interpret distance-time graphs
- interpret line graphs from real-life situations, for example conversion graphs
- interpret graphs showing real-life situations in geometry, such as the depth of water in containers as they are filled at a steady rate
- interpret non-linear graphs showing real-life situations, such as the height of a ball plotted against time.

A14h	Plot and interpret graphs (<u>including reciprocal graphs</u> **and exponential graphs**) and graphs of non-standard functions in real contexts, to find approximate solutions to problems such as simple kinematics problems involving distance, speed, and acceleration

Students should be able to:
- draw an exponential graph
- understand the main features of an exponential graph.

A12	Recognise, sketch, and interpret graphs of linear functions, quadratic functions, <u>simple cubic functions, the reciprocal function</u>, $y = \frac{1}{x}$ with $x \neq 0$.

Students should be able to:
- draw, sketch, recognise and interpret linear functions
- calculate values for a quadratic and draw the graph
- draw, sketch, recognise and interpret quadratic graphs
- draw, sketch, recognise and interpret graphs of the form $y = x^3 + k$ where k is an integer
- draw, sketch, recognise and interpret the graph $y = \frac{1}{x}$ with $x \neq 0$
- find an approximate value of y for a given value of x, or the approximate values of x for a given value of y.

A12h	Recognise, sketch and interpret graphs of linear functions, quadratic functions, <u>simple cubic functions, the reciprocal function</u>, $y = \frac{1}{x}$ with $x \neq 0$, exponential functions $y = k^x$ for positive values of **k**, and the trigonometrical functions (with arguments in degrees) $y = \sin x, y = \cos x$ and $y = \tan x$ for angles of any size

Students should be able to:
- draw, sketch, recognise and interpret graphs of the form $y = k^x$ for positive values of k
- know the shapes of the graphs of functions $y = \sin x, y = \cos x$ and $y = \tan x$

Mathematical questioning should be designed to unpick the structure of the maths and deepen the student's understanding. When students talk about mathematical concepts, they should develop the vital mathematical language that helps them explain their ideas fully.

Students are expected and encouraged to use terminology during all discussions, verbal feedback and in written content.

What prior learning supports understanding of this content?
- Know the formulae for: Pythagoras' theorem, $a^2 + b^2 = c^2$ and the trigonometric ratios,

$$\sin \theta = \frac{opposite}{hypotenuse} \quad \cos \theta = \frac{adjacent}{hypotenuse} \quad \tan \theta = \frac{opposite}{adjacent}$$

- Apply them to find angles and lengths in right-angled triangles in two-dimensional figures.
- Know and apply the Sine rule

$$\frac{a}{sinA} = \frac{b}{sinB} = \frac{c}{sinC}$$

How does this content link to future learning?
- Sketch translations and reflections of a given function
  - Transform the graph of any function $f(x)$ including: $f(x) + a$, $f(x + b)$, $- f(x)$ and $f(-x)$ where a and b are integers.
  - Recognise transformations of functions and be able to write down the function of a transformation given the original function.

and Cosine rule

$$a^2 = b^2 + c^2 - 2bc\ cos\ A$$

to find unknown lengths and angles.

Reading: *Where in the unit are students supported to read complex academic text?* • Reading and understanding mathematical questions and problems' – teacher input. • Decoding complex examination questions - explain what they are asking the student to do' – teacher input. • Following instructions to solve problems - break down the tasks – teacher input. • Recognising terminology, numbers, and symbols.	**Writing**: *Independent writing tasks and how they are structured* • Using the correct subject specific terminology for numbers and symbols – examination papers, class books. • Responding to questions that ask for an explanation or a reason – examination papers, class books. • Self-evaluation, reviewing, reflecting and analysis of own work – class books, personalised learning checklists and analysis. • Creating notes that can be used later for revision purposes - class books, revision cards, mind maps etc.

Key assessments:

How will do students review the information learned?

End of block assessments.

AQA end of block assessments provide a quick progress check at the end of each block of learning to make sure students have understood the content being covered. These are available for both foundation and higher tiers.

End of term/year assessments and mock examinations.

End of term assessments assessing the students' progress towards targets and provide diagnostic information to modify future teaching.

End of year 9 and 10 examinations assessing the students' progress towards targets and provide diagnostic information to modify future teaching.

Two mock examinations seasons take place during year 11 using previous years AQA 8300 examination papers. Students to experience the full suite of papers at both Foundation and higher tiers using Non-calculator and Calculator requirements.

All examinations will explore the three examination papers at both foundation and higher tiers using non-calculator and calculator requirements.

How will feedback be seen?

Marked end of block, term assessments and mock examinations.

Personalised learning checklists for all assessments identifying strengths and areas of development.

Written teacher feedback and marking in compliance with faculty and College Marking Policies. Student responses to marking. Students self-mark using purple pen. Verbal feedback given every lesson from teacher and peers as appropriate. Teacher and student self-assessment of presentation of class books will be completed to ensure written work is of high standard and students are achieving their potential.