KEVICC Key Stage 3 Curriculum Subject: Mathematics

Spring Half-Term Algebraic Techniques

Term: Year 8 Spring Term – Block Three | **Topic:** Indices

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

Before exploring the ideas behind the addition and subtraction laws of indices (which will be revisited when standard form is studied next term), the groundwork is laid by making sure students are comfortable with expressions involving powers, simplifying e.g. $3x^2y \times 5xy^3$. The higher strand also looks at finding powers of powers.

National curriculum content covered:

- Use and interpret algebraic notation, including a^3 in place of $a \times a \times a$; a^2b in place of $a \times a \times b$
- Use language and properties precisely to analyse algebraic expressions.
- Begin to model situations mathematically and express the results using a range of formal mathematical representations.
- Substitute values in expressions, rearrange and simplify expressions, and solve equations.

We know that breaking the curriculum down into small manageable steps should help students to understand concepts better. As a result, for each block of content in the scheme of learning we have provided the following 'small step' breakdown for this unit as follows:

Lesson One - Adding and subtracting expressions with indices
Lesson Two - Simplifying algebraic expressions by multiplying indices
Lesson Three - Simplifying algebraic expressions by dividing indices
Lesson Four - Using the addition law for indices
Lesson Five - Using the addition and subtraction law for indices
Lesson Six - Exploring powers of powers (H)

Interleaving/Extension of previous work

- Explore powers of powers

Key Vocabulary and notation.

Expression	Expand
Simplify	Numerator
Term	Denominator
Coefficient	Factor
Index/Indices	Common
Power(s)	Factor
Multiply	Base
Product	Exponent
Power	

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?

- Use and interpret algebraic notation.
- Revisit higher powers.
- Expand, and factorise into, single brackets.
- Form and use expressions, formulae, and identities.
- Form and solve equations and inequalities with and without brackets.
- Distinguish between equations, expressions, formulae and identities.

How does this content link to future learning?

- Convert between numbers in ordinary and standard form.
- Compare numbers given in standard form.
- Calculate with numbers given in standard form, with and without a calculator.

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.
- Recognising patterns and relationships in mathematics.

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 students review the information learned?
End of block assessments.
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 covered.
A Core paper – it is envisaged that all students will take this paper, to provide a direct comparison with the performance of the rest of the cohort. All topics from each term will be covered, and the use of a calculator is expected.
End of term assessments.
A Foundation paper – students who are working below national expectations will have the opportunity to show their understanding of the material with more straightforward questions. Non calculator paper.
A Higher paper – students who are working at or above national expectations will have the opportunity to tackle more challenging questions on the same material, plus the extra objectives indicated as "Higher" in our scheme of learning. Non calculator paper.
How will feedback be seen?
Marked end of block and term assessments.
Personalised learning checklists for end of term 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.