KEVICC Key Stage 3 Curriculum Subject: Mathematics

Autumn Half-Term Proportional Reasoning

Term: Year 8 Autumn Term – Block Two | **Topic:** Multiplicative Change

What is the essential knowledge from this unit? 2
What do students need to remember and understand?

Students now work with the link between ratio and scaling, including the idea of direct proportion, linking various form including graphs and using the context such as conversion of currencies which provides rich opportunities for problem solving. Conversion graphs will be looked at in this block and could be revisited in the more formal graphical work later in the term. Links are also made with maps and scales, and with the use of scale factors to find missing lengths in pairs of similar shapes.

National curriculum content covered:

- Extend and formalise knowledge of ratio and proportion in working with measures and in formulating proportional relations algebraically.
- Interpret when the structure of numerical problem requires additive, multiplicative or proportional reasoning.
- Use scale factors, scale diagrams and maps.
- Solve problems involving direct and inverse proportion, including graphical and algebraic representations.
- Move freely between different numerical, graphical and diagrammatic representations.

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 - Solve problems involving direct proportion.
Lesson Two - Explore conversion graphs.
Lesson Three - Convert between currencies.
Lesson Four - Explore direct proportion graphs (H).
Lesson Five - Explore relationships between similar shapes.
Lesson Six - Understand scale factors as multiplicative representations.
Lesson Seven - Draw and interpret scale diagrams.
Lesson Eight - Interpret maps using scale factors and ratios.

Interleaving/Extension of previous work

- Revisit area.
- Revisit equations.
- Express any ration in the form 1 : n.
- Explore direct proportion graphs.

Key Vocabulary and notation.

Proportion	Origin
Ratio	Constant
Double	Relationship
Triple	Linear
Linear	Orientation
Variable	Similar
Axes	Corresponding
Labelling	Scale factor
Units	Enlargement
Conversion	Object
Approximation	Image
Exchange rate	Length
Currency	Not to scale
Conversion	Plan
Estimate	Image
Sterling	Distance
Rate	Conversion
Directly	Units
proportional	Metric

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?

- Revisit area.
- Understand ratio and its link to multiplication.
- Use ratio notation.
- Reduce ratios to simplest form.
- Solve ratio problems.
- Calculate the circumference of a circle.

How does this content link to future learning?

- Revisit converting improper fractions and mixed numbers.
- Link to fractions of an amount.
- Multiply and divide a fraction by an integer.
- Multiply and divide a fraction by a fraction.
- Multiply and divide mixed numbers.
- Multiply and divide simple algebraic fractions.
- Understand and use the reciprocal

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.