KEVICC Key Stage 3 Curriculum Subject: Mathematics

Autumn Half-Term Proportional Reasoning

Term: Year 8 Autumn Term – Block One | **Topic:** Ratio and Scale

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

This unit focuses initially on the meaning of ratio and the various models that can be used to represent ratios. Based on this understanding, it moves on to sharing in a ratio given the whole or one of the parts, and how to use e.g. bar models to ensure the correct approach to solving a problem. After this, we look at simplifying ratios, using previous answers to deepen the understanding of equivalent ratio rather than 'cancelling' purely as a procedure. We also explore the links between ratio and fractions and understand and use π as the ratio of the circumference of a circle to its diameter. Students following the higher strand also look at gradient in preparation for next half-term

National curriculum content covered:

- Make connections between number relationships, and the algebraic and graphical representations.
- Use scale factors, scale diagrams and maps.
- Understand that a multiplicative relationship between two quantities can be expressed as a ratio or a fraction.
- Divide quantity into two parts in a given part : part or part : whole ratio; express the division of a quantity into two parts as a ratio.
- Solve problems involving direct and inverse proportion.

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 - Understand the meaning and representation of ratio
Lesson Two - Understand and use ratio notation
Lesson Three - Solve problems involving ratios of the form 1 : n (or n : 1)
Lesson Four - Solve problems involving ratios of the form m : n
Lesson Five - Divide in a given ratio
Lesson Six - Express ratios in their simplest integer form
Lesson Seven - Express ratios in the form 1 : n (H)
Lesson Eight - Compare ratios and fractions
Lesson Nine - Understand pi as a ratio
Lesson Ten - Understand gradient as a ratio (H)

Interleaving/Extension of previous work

- Revisit area.
- Revisit equations.
- Revisit converting improper fractions and mixed numbers.
- Links to fractions of an amount.

Key Vocabulary and notation.

Ratio	Simplify
Equal Parts	Common
For every	factors
Proportion	Scale
Relationship	Compare
Order	Total parts
Colon	Fraction
Divide	Proportion
Proportional	Denominator
Multiply	Numerator
Part	Perimeter
Double	Circumference
number line	Constant
Placeholder	Pi (π)
Units	Regular
Share	Diameter
Total	Right-angled
Label	triangle
Parts	Gradient
Factors	Slope
Equivalent	Steep

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?

- Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.
- Solve problems involving the calculation of percentages and use of percentage comparison.
- Solve problems involving similar shapes where the scale factor is known or can be found.
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

How does this content link to future learning?

- Use scale factors, linking ratio, to solve simple direct proportion problems.
- Express any ration in the form 1 : n
- Convert between currencies, including using graphs.
- Explore direct proportion graphs.
- Draw and interpret scale diagrams and maps.

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.