### Topic Sequence: Reasoning

| 1 | 2 | |
|---|---|---|
| Multiplicative Reasoning | Geometric Reasoning | Algebraic Reasoning |

### Topic Overview:

Students develop their multiplicative reasoning in a variety of contexts from simple scale factors through to equations involving direct and inverse proportion. There is also a review of ratio problems. Content covered includes extending and formalising their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry and in working with proportional relations algebraically and graphically. Content also includes comparing lengths, areas and volumes using ratio notation and/or scale factors; making links to similarity and understanding the equations that describe direct and inverse proportion

### Lesson Sequence:

Ratio problems
This step is an opportunity for students to revisit ratio problems and strategies for solving these. Students can be encouraged to use bar models and two-way tables where appropriate. When combining ratio, students need to consider Lowest Common Multiple situations

Use scale factors
This step reviews the concept of a scale factor. This is a good opportunity to use scale factors between 0 and 1 (reminding students that this is still an enlargement) as well as those above 1. In this step, students practice finding scale factors as well as using them and revisit the definition of a similar shape.

Understand direct proportion
This step is to understand direct proportion before introducing the algebraic form of $y = kx$. Direct proportion relationships such as diameter and circumference, converting units, currency conversions are revisited. Students are expolse to different representations such as word problems, grphs and equations. The simple direct proportion equation of $y = kx$ is then studied

Calculating with pressure and density
Students revisit rearranging simple equations with an unknown in the denominator in this step. Speed, distance and time is also reviewed, making links to direct proportion. Students consider the similar formulae for pressure and density and should have a good understanding of what these concepts are before progressing onto use of equations. Understanding of the units used is important

Understand inverse proportion
Students now consider the three variables in the speed, distance, time or mass, density, volume relationships to distinguish between direct and inverse proportion. Inverse proportion relationships are explored in different representations such as word problems, graphs and equations. Students then form simple inverse proportion equations in this step ($y = \frac{k}{x}$)

### Sequence of Learning:

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|---|---|
| 1 | Ratio problems |
| 2 | Using scale factors |
| 3 | Understand direct proportion |
| 4 | Calculate with pressure and density |
| 5 | Understand inverse proportion |

### Topic Resources:

| Knowledge Map: | Ratio and scale<br>Direct and Inverse proportion |
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### Assessment:

| Knowledge: | End of Topic Test |
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| Application of Knowledge: | Termly Summative Assessments |

### Supportive Reading:

| Any supported reading listed here | Sparx maths: www.sparxmaths.co.uk |
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| | Corbett Maths: www.corbettmaths.com |
| | AQA Revision guide |