

## Autumn Half Term 1 – Proportional Reasoning

### Block 1 – Weeks 1 and 2

#### Ratio and Scale

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

### Block 2 – Weeks 3 and 4

#### Multiplicative Change

- Use scale factors, linking to ratio, to solve simple direct proportion problems
- Convert between currencies, including using graphs
- Draw and interpret scale diagrams and maps

### Block 3– Weeks 5 and 6

#### Multiplying and dividing fractions

- Multiply and divide a fraction by an integer
- Multiply and divide a fraction by a fraction
- Understand and use the reciprocal

#### Notes/Links/Interleaving

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

#### Additional Higher Content

- Express any ratio in the form  $1:n$
- Explore direct proportion graphs
- Multiply and divide mixed numbers
- Multiply and divide simple algebraic fractions

### How do these topics benefit students in their real lives? What is the Cultural Capital offer?

Students will build their reasoning and logical thinking skills. Habit skills used include the ability to think flexibly, communicating with clarity, applying past knowledge of Proportionality (Ratio/Fractions/Percentages)

The knowledge of Ratio/Fractions/Percentages will enable students to access careers in fields such as the food industry, pharmaceuticals, financial world. These skills are important in the scientific world, particularly Chemistry where getting the ratio of different elements is vital.

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| <b>Fluency</b><br>(substantive knowledge)          | <ul style="list-style-type: none"> <li>• Understand the meaning and representation of ratio</li> <li>• Understand and use ratio notation</li> <li>• Divide a ratio into a given ratio</li> <li>• Express ratios in their simplest integer form</li> <li>• Express ratios in the form <math>1:n</math></li> </ul> | <ul style="list-style-type: none"> <li>• Convert between currencies</li> <li>• Understand scale factors as multiplicative representations</li> </ul>  | <ul style="list-style-type: none"> <li>• Represent multiplication of fractions</li> <li>• Multiply a fraction by an integer</li> <li>• Find the product of a pair of fractions</li> <li>• Multiply and divide improper and mixed fractions</li> <li>• Multiply and divide algebraic fractions</li> </ul> |
| <b>Reasoning</b><br>(disciplinary knowledge)       | <ul style="list-style-type: none"> <li>• Compare ratios and related fractions</li> <li>• Understand <math>\pi</math> as the ratio between diameter and circumference</li> <li>• Understand gradient of a line as a ratio</li> </ul>  | <ul style="list-style-type: none"> <li>• Explore conversion graphs</li> <li>• Explore direct proportion graphs</li> <li>• Explore relationships between similar shapes</li> <li>• Draw and interpret scale diagrams</li> <li>• Interpret maps using scale factors and ratios</li> </ul> | <ul style="list-style-type: none"> <li>• Divide an integer by a fraction</li> <li>• Divide a fraction by a unit fraction</li> <li>• Divide any pair of fractions</li> </ul>  |
| <b>Problem Solving</b><br>(disciplinary knowledge) | <ul style="list-style-type: none"> <li>• Solve problems with ratios in the form <math>1:n</math></li> <li>• Solve proportional problems involving the ratio <math>m:n</math></li> </ul>  | <ul style="list-style-type: none"> <li>• Solve problems involving direct proportion</li> </ul>  | <ul style="list-style-type: none"> <li>• Understand and use the reciprocal</li> </ul>  |