

Scheme of Learning: Year 8 Autumn Term

Topic Sequence: Proportional Reasoning

| 1 | 2 | 3 |
|-----------------|-----------------------|------------------------------------|
| Ratio and Scale | Multiplicative Change | Multiplying and Dividing Fractions |

Topic Overview: Ratio and Scale

This unit focuses initially on the meaning of ratio and the various models that can be used to represent ratios. Based on this understanding, the topic leads on to sharing in a ratio given the whole or one of the parts, and how to use different models (e.g., bar models) to ensure the correct approach to solving a problem. After this, simplifying ratios is focused on, using previous answers to deepen the understanding of equivalent ratios rather than “cancelling”. Links between ratio and fractions are also explored and used to understand the use of π as the ratio of the circumference of a circle to its diameter.

Learning Sequence:

Understand the meaning and representation of ratio

This small step is to ensure that students have a firmer understanding of the meaning of ratio. They will be able to represent ratios pictorially and have knowledge of the language involved. In pictorial representations, it is important to emphasise the equal parts of a ratio.

Understand and use ratio notation

This small step will introduce the use of the colon in ratio notation and link it to the representations explored in the previous step. The importance of order of terms within ratio notation will be highlighted. Most questions feature ratio comparing two parts, but students will also be exposed to ratios involving multiple parts.

Solve problems involving ratios of the form 1 : n (or n : 1)

In this small step, students will use simple multiplicative reasoning with ratio. In this early stage of ratio learning, n will always be an integer. For larger values of n , students will be introduced to the advantages of a double number line to support their calculations.

Solve proportional problems involving the ratio m : n

Students will be familiar with terminology of, for example “for every 4, there are 3”, from KS2. They will now develop their understanding of ratio alongside formal mathematical notation. Students will explore multiple methods including double number lines, finding multipliers or using bar models and then discuss which is most appropriate to the problem.

Divide a value into a given ratio

In this small step, students will be exposed to the many combinations of “sharing in a ratio” question that can be asked, and not just when the total is given. Bar modelling gives students a strategy to ensure that they have understood the information and can represent clearly what is known and what is unknown. Varying the ratios for a constant given total is useful.

Express ratios in their simplest integer form

The concept of simplifying by finding factors will be familiar to students from work on equivalent fractions. Ratios will be simplified to their smallest integer terms. Pictorial or concrete representations should be used to support understanding of the concept. Students will look at the answers to questions in previous steps and simplify these to see how the original ratio is obtained.

Compare ratios and related fractions

The previous small steps highlighted total number of parts in a ratio, which is looked at again here when finding each part as a fraction of the whole. Students often incorrectly think, for example the ratio 2 : 3 represents two-thirds of the whole. Pictorial support or using cubes etc is helpful here to address this misconception.

Understand π as the ratio between diameter and circumference

Measuring circumferences and diameters of circular objects helps to establish that the circumference is a multiple of the diameter and to find an approximation for π . Defining π as the ratio of the circumference to the diameter leads to $\pi = \frac{c}{d}$ and then the formula for the circumference.

| Sequence of Learning: | | Topic Resources: | |
|-----------------------|--|-----------------------------------|--|
| 1 | Understand the meaning and representation of ratio | Knowledge Maps: | Ratio and scale |
| 2 | Understand and use ratio notation | | |
| 3 | Solve problems involving ratios of the form 1 : n (or n : 1) | Assessment: | |
| 4 | Solve proportional problems involving the ratio m : n | Knowledge: | End of Topic test |
| 5 | Divide a value into a given ratio | Application of Knowledge: | Termly mixed topic assessment |
| 6 | Express ratios in their simplest integer form | Supportive Reading: | |
| 7 | Compare ratios and related fractions | Any supported reading listed here | Sparx Maths www.sparxmaths.co.uk |
| 8 | Understand π as the ratio between diameter and circumference | | Corbett Maths : www.corbettmaths.com |
| | | | AQA Revision Guide |