



YEAR 8 Autumn TERM 1

'An ambitious curriculum that meets the needs of all'

Medium Term Planning

1. Ratio and scale. 2. Multiplicative change. 3. Multiplying and dividing fractions.

Curriculum Intent

UNIT: Ratio and scale, (6/7 lessons)

Previously met: See notes from KS2 National Curriculum and Year 7 curriculum

This will be a new unit to a lot of pupils. There is some non-statutory from Year 6 so some pupils may have some knowledge.

- Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres. (**Year 6**).
- Use multiplicative relationships between known facts (**Year 7, Summer term, developing number sense**).

To be able to:

- Understand the meaning and representation of ratio
- Understand and use ratio notation
- Solve problems involving ratios of the form 1:n (or n:1)
- Solve problems involving ratios of the form m:n
- Divide into a given ratio
- Express ratios in their simplest integer form
- **Express ratios in the form 1:n**
- Compare ratios and fractions
- Understand pi as a ratio
- **Understand gradient as a ratio**

Skills/Assessment Objective Links

REMINDER – Strategies for teaching.

- Use of arrows going down the page to help with simplifying ratios.
- Bar models for dividing into ratios.

Links and interleaving

- Converting mixed numbers to fractions.
- Fractions of amounts.
- Modelling real life contexts. This fits into all parts of mathematics, any context which requires unknowns.

Multiplicative change (6/7 lessons)

Previously met: See notes from KS2 National Curriculum and Year 7

- Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres. (**Year 6**).

- Use multiplicative relationships between known facts (**Year 7, Summer term, developing number sense**).

To be able to:

- Solve problems involving direct proportion.
- Explore conversion graphs.
- Convert between currencies.
- **Explore direct proportion graphs.**
- Explore relationships between similar shapes.
- Understand scale factors as multiplicative representations.
- Draw and interpret scale diagrams.
- Interpret maps using scale factors and ratios.

Links and interleaving

- Revisit area within similar shapes and scale factors.
- Solving equations could also be linked when looking at similar shapes, specifically for higher attaining pupils.
- Modelling real life contexts. This fits into all parts of mathematics, any context which requires unknowns. This certainly fits well with area.
- Money and units of measure, specifically with currency .

Multiplying and dividing fractions (6/7 lessons).

Previously met: See notes from KS2 National Curriculum

- Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams (**Year 5**).
- Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] (**Year 6**).
- Divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] (**Year 6**).

To be able to:

- Represent multiplication of fractions
- Multiply a fraction by an integer.
- Find the product of a pair of unit fractions
- Find the product of a pair of any fractions.
- Divide an integer by a fraction.
- Divide a fraction by a unit fraction.
- Understand and use the reciprocal.
- Divide any pair of fractions.
- **Multiply and divide improper and mixed fractions.**
- **Multiply and divide algebraic fractions.**

Links and interleaving

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

Spiritual, moral, social, and cultural development	<p>SMSC: Making choices, looking for patterns which may reflect the natural world, supporting and collaborating with each other, realisation that mathematics is an international language and making cultural links as we explore the history of mathematics.</p> <p>PSHE/British Values: Working collaboratively, being respectful during discussion and valuing contributions made by others</p> <p>Skills Builder: Key skills in numeracy used in all topic areas.</p>
Numeracy	Focus on key skills.
Literacy	<p>Vocabulary Tier 2: Command words displayed in the classroom and italicized/bold font used in shared resources/presentations. These are a constant focus in discussion and questioning,</p> <p>Vocabulary Tier 3: Title slide in all shared resource presentations show the key vocabulary for each topic.</p> <p>Reading: Underlining command words,</p> <p>Writing: Modelling solutions</p> <p>Oracy: Think, pair, share, discussion, verbal feedback (peer to peer), questioning, student modelling</p>
Becoming future ready	<p>Personal Skills: As a Mathematics student you will learn many skills: you will gain opportunities to listen to others supportively and to use questioning to develop your own understanding, you will learn how to cope with challenging questions and how to build up your resilience, you will get the chance to work on your own and with others. You will develop problem solving skills and you will learn how to break a problem down into smaller more manageable steps. You will learn how to collaborate with others when solving problems and you will learn how to articulate your solution to a problem.</p> <p>Employability: Mathematical skills are invaluable in the workplace. There are many transferable skills which are much valued by employers. Specific career paths for each topic are discussed at the beginning of each unit of work.</p>
Adaptation	<ul style="list-style-type: none"> • By progressive questioning: exploring pupils' understanding through interactive dialogue. • By outcome: different learners will produce different outcomes. • By resource: worksheets are clearly presented and accessible. • By intervention: by providing different levels of supervision and support. • By grouping/setting: according to prior attainment, gender, social preference, preferred learning style. • By offering optional activities: In class or as homework, to extend learning.
QFT/SEND Provision	
Implementation Curriculum Delivery	<p>Support (S), Core (C), Extension (E).</p> <p>Ratio and scale – small steps</p> <ul style="list-style-type: none"> • Understand the meaning and representation of ratio (S) • Understand and use ratio notation (S) • Solve problems involving ratios of the form 1:n (or n:1) (C) • Solve problems involving ratios of the form m:n (C) • Divide into a given ratio (S) • Express ratios in their simplest integer form (C) • Express ratios in the form 1:n (E) • Compare ratios and fractions (For weaker classes, just try and link ratios and fractions) (S/C) <p><u>Extension tasks – These could be interleaved within the core knowledge.</u></p> <ul style="list-style-type: none"> • Understand pi as a ratio (E) • Calculate the circumference of a circle (E) • Understand gradient as a ratio (E) <p>Multiplicative change – small steps</p> <ul style="list-style-type: none"> • Solve problems involving direct proportion. (For weaker classes, focus on the unitary method first). (S/C) • Explore conversion graphs. (S/C) • Convert between currencies. (S/C) • Explore direct proportion graphs.(C) • Explore relationships between similar shapes. (C) • Understand scale factors as multiplicative representations. (C) • Draw and interpret scale diagrams. (S/C) • Interpret maps using scale factors and ratios. (C) <p><u>Extension tasks</u></p> <ul style="list-style-type: none"> • Investigate areas with similar shapes. • Similar shapes with have fractional/decimal dimensions.
Learning Outcomes (Most Powerful Knowledge)	

	<ul style="list-style-type: none"> • Similar shapes which may lead to forming and solving an equation. <p>Multiplying and dividing fractions - small steps</p> <ul style="list-style-type: none"> • Represent multiplication of fractions (S) • Multiply a fraction by an integer. (S) • Find the product of a pair of unit fractions (S) • Find the product of a pair of any fractions. (S/C) • Divide an integer by a fraction. (C) • Divide a fraction by a unit fraction (C). • Understand and use the reciprocal. (C) • Divide any pair of fractions. (C) • Multiply and divide improper and mixed fractions. (E) • Multiply and divide algebraic fractions. (E) <p><u>Extension</u></p> <ul style="list-style-type: none"> • Areas of shapes which involve fractions. • Solving multi-step equations which involve fractions.
Current learning to be developed in the future within:	<p><u>Ratio and scale</u></p> <ul style="list-style-type: none"> • Ratio and fractions, higher content (Year 10, Spr 2) • Ratios in the context of areas and volume (Year 10, Spr 2) <p><u>Multiplicative change</u></p> <ul style="list-style-type: none"> • Solve direct proportion problems (Year 9, Sum 1) • Inver proportion (Year 9, Sum 1) • Similar shapes (Year 10, Aut 2) • Enlargement (Year 10, Aut 2) • Area and volume similarity (Year 10, Aut 2) • Direct and inverse proportion numerically and graphically (Year 11, Spr 1) • Pressure and density (Year 11, Spr 1) • Variation with powers and roots (Year 11, Spr 1) <p><u>Multiplying and dividing fractions</u></p> <ul style="list-style-type: none"> • Revisit fraction arithmetic (Year 9, Spr 1)
Assessment	Refer to assessment maps for formative and summative assessment opportunities.
Impact	Attainment and Progress – Refer to assessment results / data review documentation.