



YEAR 11 Spring TERM 1

'An ambitious curriculum that meets the needs of all'

Medium Term Planning – Units 7, 8 & 9

Multiplicative reasoning Geometric reasoning Algebraic reasoning

Curriculum Intent

UNIT 7: Multiplicative reasoning **H (8) and F (12)**

From Autumn 2

Previously met: Y10 similarity, ratio Y9: Rates: compound measures

To be able to:

- Use scale effectively in diagrams (including enlargement)
- Understand ratio
- Work with direct and indirect proportion
- **Solve proportion questions involving powers**
- Calculate with pressure and density
- Solve problem relating to best buys, currency conversions, unit conversions and other problems in a context

Links and interleaving

Substitution, graphs, linear equations, graph transformations, roots, simultaneous equations.

UNIT 8 : Geometric reasoning **H (8) and F (8)**

Previously met: KS3: angle rules Y9 Pythagoras, Y10 Trigonometry and circle theorems

To be able to:

- Use angle rules and provide robust reasoning
- Construct formal proofs
- Use Pythagoras and reason eg prove a triangle is right-angled
- Use trigonometry in a context
- **Use trigonometry and Pythagoras in three dimensions**
- **Use further trigonometry in context**
- **Construct formal geometric proofs including remaining circle theorems**

Links and interleaving

Angles, polygons, Pythagoras, circle theorems, trigonometry

UNIT 9:Algebraic reasoning **H (8) and F (8)**

To be able to

- Use and understand the rules of indices
- **Work with negative and fractional indices**
- Recap n^{th} term of a sequence

Skills/Assessment Objective Links

	<ul style="list-style-type: none"> • Find the n^{th} term of a quadratic sequence • Justify why a number is/isn't in a sequence <p><u>Links and interleaving</u></p> <p>Surds, sequences, Pythagoras, prime factorization, HCF, Fibonacci, square numbers, triangular numbers,</p>
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><u>Unit 7 Multiplicative Reasoning</u></p> <p>Pre-requisites</p>

<p>Learning Outcomes (Knowledge)</p>	<ul style="list-style-type: none"> • Multiplication tables • Units • Ratio tables • Area and volume <p>Foundation Tier (up to Grade 5)</p> <ul style="list-style-type: none"> • Scale factors and recap of similarity. • Currency conversion and best buy problems. • Speed, distance time questions • Mass, density and Volume • Pressure, area and volume • Ratio problems • Inverse proportion in context (eg three workers take 5 hours....) <p>Additional content for Higher Tier (up to Grade 9)</p> <ul style="list-style-type: none"> • Direct proportion • Inverse proportion • Complex ratio • Add 'product rule used for counting' (revisited in Unit 11). <p><u>Unit 8 Geometric Reasoning</u></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> • Basic angle rules • Angles in polygons • Bearings • Vectors <p>Foundation Tier (up to Grade 5)</p> <ul style="list-style-type: none"> • Trigonometry • Pythagoras • Proving geometric tasks <p>Additional content for Higher Tier (up to Grade 9)</p> <ul style="list-style-type: none"> • Circle theorems • Further Trigonometry • Vector geometry • Add proof of congruency (revisit Unit 10) <p><u>Unit 9 Algebraic Reasoning</u></p> <p>Pre-requisites</p> <ul style="list-style-type: none"> • Equations • Expressions • Straight line graphs • Quadratic graphs • Rules of indices <p>Foundation Tier (up to Level 5)</p> <ul style="list-style-type: none"> • nth term of a sequence • simplifying expressions (including using indices) • simultaneous equations • using equations to solve problems (eg in shape) <p>Additional content for Higher Tier (up to Grade 9)</p> <ul style="list-style-type: none"> • quadratic sequences • algebraic proof • quadratic simultaneous equations • inequalities on graphs
<p>Current learning to be developed in the future within:</p>	<p>A Level mathematics: Graphs, transformations, modelling, algebra, sequences and series</p>
<p>Assessment</p>	<p>Refer to assessment maps for formative and summative assessment opportunities.</p>
<p>Impact</p>	<p>Attainment and Progress – Refer to assessment results / data review documentation.</p>