Fairfield High School for Girls

Mathematics – Year 9 Long-Term Plan 2025-2026

Calendar	Topic	Assessment	Sequencing and Coherence *concepts - themes - skills*	Literacy *reading - vocabulary - oracy - writing*
Autumn - Half Term 1	**<u>Decimals</u>** • Compare and order decimals • Convert between fractions and decimals • Use recurring decimal notation including converting between recurring decimals and fractions • Calculate with decimals • Calculate with money **<u>Rounding and bounds</u>** • Round to the nearest power of ten, hundred, thousand, decimal places and significant figure(s) • Estimate using rounding • Determine whether calculations using rounding will give	A 30 minute in-class, Key Topic Test *(mini-summative assessments with formative follow-up)* based on: • Decimals • Rounding and bounds • Compound measures • Expanding and factorising *Note: Throughout the year, pupils complete short, focused assessments called Key Topic Tests. These help classroom teachers quickly identify any gaps in understanding so they can address them before moving on to new content. The tests also help us*	**Decimals** **Why first?** Decimals are foundational for many other topics, especially in measurement, estimation, and algebra. Year 9 students often revisit and deepen their understanding of decimals to prepare for more complex applications. **2. Rounding and Bounds** **Why next?** This topic builds on decimals and prepares students for estimation, error analysis, and real-world problem-solving. **3. Compound Measures** **Why now?** This topic applies decimals and rounding in real-world contexts, reinforcing their importance and introducing proportional reasoning. **4. Expanding and Factorising** **Why now?** Algebraic manipulation is a core skill that supports future topics like solving equations, graphing, and proofs. It also connects to area and geometry. **Why this sequence works** 1. **Builds from number to algebra**: Starting with decimals ensures fluency in number operations. 2. **Applies number to real-world contexts**: Rounding and compound measures show practical applications.	**Development of Mathematical Vocabulary** Across all topics, pupils are introduced to and expected to use precise mathematical terms such as: Integer, inequality, recurring decimal, estimation, bounds, truncating Speed, density, pressure, compound measures, ratio, units Expand, factorise, brackets, algebraic proof **2. Reading and Interpreting Mathematical Texts and Representations** Interpreting distance-time graphs and error intervals requires pupils to extract meaning from visual

	an underestimate or overestimate • Determine upper and lower bounds • Write error intervals understanding the inequality notation • Understand the difference between rounding and truncating **<u>Compound Measures</u>** • Work with time including calculations conversions • Work with speed distance and time, including using ratio tables • Interpret distance, time graphs • Solve simple problems involving density, mass and volume stating the correct units • Solve simple problems involving pressure, force and area stating the correct units	*monitor how pupils are progressing over time, allowing subject leaders to provide additional support or interventions where needed. Topics include those on the left plus 1-2 topics from previous terms/years*	3. **Transitions into abstract reasoning**: Algebra topics build on arithmetic and geometric understanding. 4. **Supports cross-topic connections**: For example, bounds and estimation are useful in compound measures and algebraic problem-solving. **Sequence** / **Builds On** / **Prepares For** / **Key Skills Developed** **Decimals** / KS3 number fluency / Rounding, measures / Place value, operations **Rounding & Bounds** / Decimals / Estimation, compound measures / Approximation, inequalities **Compound Measures** / Decimals, rounding / Graphs, modelling / Units, proportional reasoning **Expanding & Factorising** / Arithmetic fluency / Equations, functions / Algebraic manipulation	and symbolic representations. Understanding algebraic expressions in geometric contexts (e.g. area and perimeter) supports reading comprehension in applied settings. **3. Speaking and Listening for Reasoning** Pupils are encouraged to explain their reasoning, particularly when justifying whether a result is an overestimate or underestimate, or when proving algebraic identities. Opportunities for paired discussion and mathematical argument arise in tasks involving compound measures and algebraic proofs.

	• Solve contextual problems involving compound measures. Extension topics • Find the average speed of a whole journey given the speed for two parts of the journey • Calculate speed given a distance, time graph. • Solve force and density problems where it is necessary to calculate an area or volume **<u>Expanding and Factorising</u>** • Expand two single brackets • Expand and simplify double brackets in the form $(x+a)(x+b)$ and $(x+a)^2$ (Y8 Recap) • Expand and simplify double brackets in the			

	form $(mx+a)(nx+b)$ and $(mx+a)^2$ • Work with algebraic expressions to work out areas, perimeters etc. • Factorise into single brackets (Y8 Recap) • Factorise monic quadratics into double brackets Extension • Expand double brackets with the application of laws of indices • Expand triple brackets • Factorise monic quadratics into double brackets • Factorise non-monic quadratics • Algebraic proofs including area, Pythagoras' theorem etc			

Autumn - Half Term 2	**Changing the Subject** • Understand differences between expression, identity, equation and formulae • Substitute into formulae which requires no rearranging • Change the subject of a basic formulae (one step then two steps) • Substitute into formulae that requires rearranging • Use formulae in context • Change the subject of more complex formulae that requires expansion Extension • Change the subject of complex formulae that contain a variable on both sides and/or in the denominator of a fraction **Right angled Triangles** • Identify the hypotenuse on a right-angled triangle	As above using the topics on the left	**1. Changing the Subject of a Formula** **Why now?** This topic builds directly on algebraic manipulation skills developed in **Expanding and Factorising**. It also prepares students for applying formulae in geometry and trigonometry, which follow next. **Why now in the overall sequence?** • Students are now fluent in algebraic operations and understand expressions, equations, and identities. • They've seen formulae in compound measures (e.g., Speed=Distance/Time), so now they learn to rearrange them. **Pedagogical benefits:** • Strengthens algebraic fluency. • Prepares students for rearranging geometric and trigonometric formulae. • Encourages understanding of structure and logic in equations. **Links to previous topics:** • **Expanding and Factorising**: Needed to rearrange expressions like y=3(x+2) • **Compound Measures**: Rearranging speed, density, and pressure formulae • **Decimals & Bounds**: Substituting decimal values and estimating results **2. Right-Angled Triangles (Pythagoras & Trigonometry)** **Why now?** This topic applies algebra and formula manipulation in a geometric context. It also introduces trigonometric ratios, which are essential for GCSE and beyond.	**.Development of Mathematical Vocabulary** Students learn and use precise terms Differentiating between similar terms (e.g. *identity* vs *equation*) strengthens conceptual understanding and communication. Vocabulary is reinforced through repeated use in different contexts (e.g. "substitute" in algebra and trigonometry). **2. Reading and Interpreting Mathematical Texts and Representations** Students interpret formulae, diagrams, and geometric descriptions, translating between visual and symbolic forms. Worded problems in surface area and trigonometry require identifying relevant information and converting it into mathematical operations. Rearranging formulae and solving contextual

	• Substitute correctly into Pythagoras' theorem and use to find the hypotenuse and then use to find one of the shorter sides (Y8 Recap) • Solve multi-step problems involving Pythagoras' theorem including geometric situations Core content • Use trigonometry to work out a missing side or a missing angle using trig ratios • Apply trig ratios (and Pythagoras) to context questions or multi-step questions, including those featuring angles of elevation and depression. Extension content • Make use of trig ratios (and Pythagoras) in 3D contexts • Use exact trig values – without a calculator: 30, 45, 60 **Surface Area** • Find area of rectilinear shapes (Y7 Recap)		**Why now in the overall sequence?** • Students can now rearrange and substitute into formulae confidently. • They've worked with units and real-world contexts in compound measures, which helps with interpreting geometric problems. **Pedagogical benefits:** • Develops spatial reasoning and problem-solving. • Introduces trigonometry in a structured way, starting from Pythagoras. • Builds towards 3D geometry and advanced applications. **Links to previous topics:** • **Changing the Subject**: Rearranging trig formulae to find angles or sides • **Compound Measures**: Interpreting angles and distances in real-world problems • **Decimals & Bounds**: Calculating with decimals and estimating lengths **3. Surface Area and Volume** **Why now?** This topic consolidates geometry and algebra, applying both to solve real-world problems. It also revisits and extends earlier work on area and volume. **Why now in the overall sequence?** • Students now understand how to manipulate formulae and apply them in geometric contexts. • They've used Pythagoras and trigonometry to find missing lengths, which is essential for surface area problems. **Pedagogical benefits:**	problems develops comprehension of mathematical syntax and structure. **3. Speaking and Listening for Reasoning** Explaining steps in rearranging formulae or solving geometric problems encourages structured verbal reasoning. Group work and class discussions around multi-step problems (e.g. using Pythagoras in 3D) promote mathematical dialogue. Justifying methods and interpreting others' reasoning builds confidence in using mathematical language aloud.

	• Find the volume of prisms (Y8 Recap) • Work out the surface area of prisms; cubes, cuboids and triangular prisms • Work out area and circumference of circle (Y8 Recap) • Work out the surface area of a cylinder • Solve more complex contextual problems where surface area is required. • Problem solving involving volume and surface area of a cube Extension topics: • Work backwards to work out missing lengths given volumes or surface areas • Use of Pythagoras to work out missing lengths which are required for a volume or area • Simplify algebraic volumes or surface areas		• Reinforces spatial understanding and measurement. • Encourages multi-step problem solving. • Prepares students for GCSE topics like 3D geometry and mensuration. **Links to previous topics:** • **Right-Angled Triangles**: Use Pythagoras to find missing dimensions • **Changing the Subject**: Rearranging volume formulae to find height or radius • **Decimals & Bounds**: Calculating with π, estimating surface areas	

Sequence	Builds On	Prepares For	Key Skills Developed
Change the Subject	Algebraic manipulation	Trigonometry surface area	Rearranging, substitution
Right-Angled Triangle	Formulae, substitution	3D geometry, surface area	Spatial reasoning, trig
Surface Area	Area, volume, Pythagoras	Mensuration, problem solving	Geometry, algebra, units

Spring - Half Term 3	**Linear Graphs** • Plot and draw horizonal and vertical lines (and y = x) • Plot and draw graphs of straight lines using a table of values • Work out the gradient of a line segment • Work out the equation of a given straight-line from its graph using the y-intercept and gradient • Work out the gradient of a line between two points • Plot two lines and find where they intercept **Extension** • Identify parallel lines from their graphs and from their gradients • Calculate the equation of a line given two points • Identify if a set of coordinates lie on a line and work out	As above using the topics on the left	**1. Linear Graphs** **Why now?** Linear graphs are a natural progression from algebraic manipulation and formula work. They provide a visual and conceptual understanding of equations and relationships between variables. **Why now in the overall sequence?** • Students have already worked with algebraic expressions and rearranging formulae. • They've used coordinates in geometry (e.g., surface area, Pythagoras), so plotting points is familiar. • This topic introduces the concept of **functions** and **relationships**, which is foundational for GCSE. **Pedagogical benefits:** • Reinforces the meaning of gradient and intercept. • Builds understanding of proportional and linear relationships. • Prepares students for solving equations graphically and interpreting real-world graphs. **Links to previous topics:** • **Changing the Subject**: Rearranging to get y=mx+c • **Expanding and Factorising**: Used when simplifying equations before graphing • **Compound Measures**: Graphs of speed or cost over time • **Decimals & Bounds**: Accurate plotting and interpreting values **2. Quadratic Graphs** **Why now?** Quadratic graphs extend students' understanding of algebraic relationships and introduce non-linear functions. They also	**1. Development of Mathematical Vocabulary** **Linear Graphs**: Introduces and reinforces terms in the left box. These terms are foundational for algebraic and graphical reasoning. **Quadratic Graphs**: Adds vocabulary helping students describe and interpret non-linear relationships. **Standard Form**: Develops understanding of terms which are essential in both mathematical and scientific contexts. **2. Reading and Interpreting Mathematical Texts and Representations** **Linear Graphs**: Students interpret tables of values, graph axes, and coordinate grids. They learn to

	other coordinates on a line • Work out x intercepts from an equation **Quadratic Graphs** • Substitute values into expressions involving squares • Plot and draw simple quadratic graphs using a table of values • Use a quadratic graph to estimate values • Recognise the form of a quadratic graph Extension content • Plot and draw more complex graph graphs using a table of values • Use linear and quadratic graphs to find approximate solutions of simultaneous equations (one linear and one quadratic) **Standard Form** • Multiply by powers of 10 (Y7/Y8 recap) • Understand, know, use and convert with standard form notation • Order a list of numbers in which some or all		prepare students for solving equations graphically and understanding symmetry. **Why now in the overall sequence?** • Students are confident with plotting linear graphs and using tables of values. • They've worked with squaring in Pythagoras and algebraic expressions. • This topic introduces the concept of **curved graphs** and **non-linear change**, which is essential for GCSE. **Pedagogical benefits:** • Develops understanding of non-linear relationships. • Introduces estimation and interpretation of graphs. • Prepares students for solving quadratic equations and simultaneous equations graphically. **Links to previous topics:** • **Expanding and Factorising**: Needed to understand the structure of quadratics • **Changing the Subject**: Rearranging quadratics for substitution • **Linear Graphs**: Compare linear vs quadratic behaviour • **Surface Area**: Use of squared terms in area formulae **3. Standard Form** **Why now?** Standard form is a number topic that supports scientific and real-world applications. It's placed here to consolidate number skills after a heavy focus on algebra and graphs. **Why now in the overall sequence?** • Students have used large and small numbers in geometry and compound measures. • They're now ready to handle scientific notation and calculator use.	extract information from graphs and equations, and to translate between algebraic and graphical forms. **Quadratic Graphs**: Requires interpreting curved graphs, identifying key features (e.g., turning points), and using graphs to estimate solutions—supporting visual literacy and inference. **Standard Form**: Involves interpreting very large or small numbers in different formats, comparing magnitudes, and using calculators correctly—skills that support comprehension of scientific data and real-world contexts. **3. Speaking and Listening for Reasoning** **Linear Graphs**: Students explain how to find gradients and

	are written in standard form • Know how to enter numbers in standard form on a calculator • Add ,subtract, multiply and divide using standard form		• It provides a break from algebra-heavy content while reinforcing calculator fluency and estimation. **Pedagogical benefits:** • Supports science curriculum (e.g., speed of light, atomic size). • Reinforces powers of 10 and place value. • Prepares students for calculations involving very large or small numbers. **Links to previous topics:** • **Decimals & Bounds**: Understanding place value and estimation • **Compound Measures**: Use of large/small units (e.g., km/h, mm^3) • **Changing the Subject**: Substituting standard form values into formulae • **Graphs**: Interpreting scientific data on graphs	intercepts, describe relationships between variables, and justify whether lines are parallel or intersecting. **Quadratic Graphs**: Encourages discussion about the shape and features of graphs, estimation of values, and comparison with linear graphs—promoting deeper reasoning and explanation. **Standard Form**: Students articulate how and why standard form is used, explain calculation steps, and discuss the appropriateness of different representations in context (e.g., astronomy, finance).

Sequence	Builds On	Prepares For	Key Skills Developed
Linear Graphs	Algebra, formulae	Functions, solving equations	Graphing, gradient, intercept
Quadratic Graphs	Linear graphs, algebra	Solving quadratics, symmetry	Non-linear relationships

				Standard Form	Decimals, powers of 10	Science, calculator fluency	Scientific notation, estimation	
Spring - Half Term 4	**Transformations** • Perform and describe a reflection, rotation, translation and enlargement of 2D shapes • Describe and transform 2D shapes by a fractional enlargement with a centre • Transform 2D shapes using combined rotations, reflections, translations, or enlargements • Understand the congruency of the objects and images in rotations, reflections and translations Extension • Describe and transform 2D shapes by an enlargement using negative scale factors	As above using the topics on the left	**Transformations** **Why now?** Transformations are a visual and spatial topic that builds on students' understanding of coordinates, symmetry, and congruence. It provides a break from algebra-heavy content while reinforcing geometric reasoning. **Why now in the overall sequence?** • Students have worked with coordinates in **linear and quadratic graphs**. • They've used geometric reasoning in **surface area** and **right-angled triangles**. • This topic introduces **congruence and similarity**, which are foundational for GCSE geometry. **Pedagogical benefits:** • Develops spatial awareness and visualisation. • Reinforces coordinate geometry and symmetry. • Introduces the concept of **invariance** and **congruence**. **Links to previous topics:** • **Linear Graphs**: Coordinates and plotting • **Right-Angled Triangles**: Use of distances and angles • **Surface Area**: Understanding shape properties and dimensions **2. Percentages** **Why now?**	**1. Development of Mathematical Vocabulary** **Transformations**: Introduces precise geometric terms (see left column). These terms help students describe spatial changes clearly and accurately. **Percentages**: Reinforces vocabulary like *increase*, *decrease*, *multiplier*, *reverse percentage*, *simple interest*, *compound interest*, and *depreciation*, which are essential in financial and real-life contexts. **Angles in Polygons**: Develops understanding of terms such as *interior angle*, *exterior angle*, *regular polygon*, *parallel lines*, and *angle sum*,

	• Map a point on a shape under a combination of transformations • Invariance **Percentages** • Understand and use multipliers for percentage increase and decrease (Y8 Recap) • Calculate percentage increase and decrease (Y8 Recap) • Calculate reverse percentages • Work out the percentage change from one quantity to another • Work out simple interest to find the final amount and the interest received • Work out compound interest to find the final amount and the interest received • Know the difference between simple interest and compound interest **Extension Content** • Perform other repeated percentage change e.g.		Percentages are a core number topic with wide applications in finance, data, and real-life problem solving. It builds on students' fluency with decimals and proportional reasoning. **Why now in the overall sequence?** • Students have developed strong number fluency through **standard form**, **compound measures**, and **decimals**. • They're now ready to apply this fluency to **financial maths** and **growth/decay models**. **Pedagogical benefits:** • Reinforces multiplicative reasoning. • Prepares students for GCSE finance and functional maths. • Introduces exponential growth and decay through compound interest. • **Links to previous topics:** • **Decimals & Rounding**: Accurate calculations and estimation • **Compound Measures**: Real-life applications (e.g., speed, finance) • **Standard Form**: Large-scale financial data • **Graphs**: Plotting growth/decay curves **3. Angles in Polygons** **Why now?** This topic consolidates students' understanding of angle rules and introduces polygon properties. It's a natural follow-on from transformations and geometry. **Why now in the overall sequence?** • Students have worked with **shapes and transformations**, so they're familiar with geometric properties.	supporting both geometric reasoning and algebraic application. **Proportion**: Introduces and reinforces terms like direct proportion, inverse proportion, unitary method, constant of proportionality, and scaling, which are foundational in both algebra and real-world problem solving. **2. Reading and Interpreting Mathematical Texts and Representations** **Transformations**: Students interpret diagrams, grids, and coordinate systems, and must follow multi-step instructions to perform and describe transformations. **Percentages**: Requires interpreting word problems, identifying key information, and translating between verbal descriptions and numerical operations. **Angles in Polygons**: Involves reading geometric diagrams,

depreciation, population growth, decay
- Work backwards in order to work out the interest rate or the number of years

Angles in Polygons
- Know and use basic angle including parallel line rules
- Know and apply angle rules for triangles and quadrilaterals, including special traingles/quadrilaterals
- Recognise and name regular polygons
- Use the sum of the interior angles and the fact that the sum of the interior angles of an n-sided polygon is 180(n - 2) and the exterior angles of any polygon add to 360
- Use these rules to find missing angles in polygons

Extension
- Use a combination of all angle rules in order to find missing angles in compound shapes that involved polygons.

- They've used **angle rules** in **right-angled triangles** and **surface area** contexts.
- This topic prepares students for **proof**, **reasoning**, and **problem-solving** in geometry.

Pedagogical benefits:
- Reinforces logical reasoning and deduction.
- Introduces generalisation through algebraic expressions (e.g., 180(n−2)).
- Supports spatial understanding and classification of shapes.

Links to previous topics:
- **Transformations**: Understanding congruence and symmetry
- **Right-Angled Triangles**: Use of angle rules
- **Changing the Subject**: Rearranging angle formulas
- **Algebra**: Expressing angle relationships algebraically

Sequence	Builds On	Prepares For	Key Skills Developed
Transformation	Coordinates, geometry	Congruence, similarity	Spatial reasoning, symmetry
Percentages	Decimals, ratios	Finance, growth/decay	Proportional reasoning

applying angle rules, and sometimes setting up and solving equations based on visual information.
Proportion: Students interpret tables, graphs, and contextual problems (e.g. recipes, currency exchange), and translate them into mathematical relationships.

3. Speaking and Listening for Reasoning
Transformations: Students explain how a shape has been transformed, justify congruency or similarity, and describe sequences of transformations using precise language.
Percentages: Encourages discussion of strategies for calculating increases, decreases, and interest, and explaining the difference between simple and compound interest.
Angles in Polygons: Students justify angle calculations using known rules and explain how they deduced missing

	• Set up and solve equations using angle rules		**Angles in Polygons** | Angle rules, transformations | Proof, reasoning | Deduction, generalisation	angles in compound shapes. **Proportion**: Promotes reasoning through real-life contexts (e.g. "Why is this the best buy?"), and explaining how to identify and apply proportional relationships.
Summer - Half Term 5	**Proportion** • Use direct proportion and the unitary method in recipe problems, best buy problems, currency conversions (Y8 Recap) • Identify direct proportion by inspecting values in a table (Y8 Recap) • Identify inverse proportion in given relationships (Y8 Recap) • Answer more complex proportion problems with multiple variables i.e. 2 workers can fill 100 envelopes in 2 hours • Identify direct proportion and inverse	As above using the topics on the left	**1. Proportion** **Why now?** Proportion is a core concept that underpins many areas of mathematics, including algebra, geometry, and real-world problem solving. It builds on students' understanding of ratios, percentages, and multiplicative reasoning. **Why now in the overall sequence?** • Students have already worked with **percentages**, **compound measures**, and **linear graphs**, all of which involve proportional reasoning. • They are now ready to handle more complex proportional relationships, including **inverse proportion** and **formulae involving constants**. **Pedagogical benefits:** • Reinforces multiplicative thinking and ratio reasoning. • Prepares students for GCSE topics like variation, scaling, and modelling. • Supports real-life applications such as recipes, best buys, and currency conversions. **Links to previous topics:** • **Percentages**: Repeated percentage change is a form of exponential proportion	**1. Development of Mathematical Vocabulary** **Proportion**: Introduces and reinforces terms such as *direct proportion*, *inverse proportion*, *unitary method*, *constant of proportionality*, and *scaling*. These terms are essential for describing relationships between quantities. **Venn Diagrams**: Develops set language including *union*, *intersection*, *complement*, *A'*, and *conditional probability*. This supports logical

	proportion by inspecting graphs Extension • Write and use a formula connecting two variables that are in direct or inverse proportion by finding the proportion constant k, finding missing values **Venn Diagrams** • Introduction to Venn Diagrams using properties of numbers • Work out probabilities from Venn diagrams • Complete a Venn diagram given information • Use union and intersection notation • Use set vocabulary and notation such as complement and A' Extension Content • Further set notation • Use of Venn diagrams with algebraic expressions • Conditional probability **Congruency and Similarity** • Identify lines of symmetry and order of rotational symmetry		• **Compound Measures**: Speed, density, and pressure involve proportional relationships • **Linear Graphs**: Direct proportion graphs are linear through the origin • **Changing the Subject**: Rearranging proportion formulae **2. Venn Diagrams** **Why now?** Venn diagrams introduce students to set theory and probability in a visual and structured way. This topic supports logical reasoning and introduces formal notation used in GCSE and A-level maths. **Why now in the overall sequence?** • Students have developed confidence with **notation**, **algebra**, and **problem-solving**. • They are ready to apply these skills to **probability and logic-based reasoning**. **Pedagogical benefits:** • Develops understanding of sets, intersections, and complements. • Supports probability reasoning and data interpretation. • Introduces formal notation and logical structure. **Links to previous topics:** • **Percentages & Proportion**: Probability as a proportion • **Algebra**: Use of expressions in set notation • **Graphs**: Logical structure and interpretation of data **3. Congruency and Similarity** **Why now?** This topic consolidates geometric reasoning and introduces formal proof and construction skills. It builds on students'	reasoning and precise communication. **Congruency and Similarity**: Builds vocabulary around *symmetry*, *congruent*, *similar*, *scale factor*, *bisector*, and *construction*, which are key for geometric reasoning and proof. **2. Reading and Interpreting Mathematical Texts and Representations** **Proportion**: Students interpret tables, graphs, and contextual problems (e.g. recipes, currency exchange), and translate them into mathematical relationships and formulae. **Venn Diagrams**: Requires interpreting visual representations of sets and probabilities, and translating between

	• Identify congruent shapes, understand the meaning of 'congruent' • Use congruence to find missing lengths and angles • Construct and identify perpendicular bisectors and construct perpendiculars to lines from a given point • Construct and identify angle bisectors • Accurately draw triangles using ruler, pair of compass and protractor • Identify scale factors in similar shapes • Use scale factors to find missing lengths in similar shapes Extension • Simple congruency proofs • Use similarity to solve problems including shapes with shared and parallel lengths and involving algebraic expressions • Use ratios to compare the length of two similar shapes.		understanding of transformations and prepares them for higher-level geometry. **Why now in the overall sequence?** • Students have studied **transformations**, **angles**, and **surface area**, so they are familiar with shape properties and symmetry. • They are now ready to explore **formal geometric reasoning** and **similarity**. **Pedagogical benefits:** • Reinforces spatial reasoning and geometric vocabulary. • Introduces proof and logical deduction. • Develops construction and measurement skills. **Links to previous topics:** • **Transformations**: Congruence through reflection, rotation, translation • **Angles in Polygons**: Use of angle rules in congruent/similar shapes • **Proportion**: Similarity involves proportional reasoning • **Algebra**: Use of expressions in similarity problems **Sequence** / **Builds On** / **Prepares For** / **Key Skills Developed** **Proportion** / Percentages, graphs / Variation, modelling / Ratio, multiplicative reasoning	diagrams and symbolic notation. **Congruency and Similarity**: Involves reading geometric diagrams, identifying properties, and interpreting construction instructions using tools like compasses and protractors. **3. Speaking and Listening for Reasoning** **Proportion**: Students explain how quantities are related, justify methods for solving problems, and discuss proportional reasoning in real-world contexts. **Venn Diagrams**: Encourages verbal reasoning about set relationships, probabilities, and logical connections between groups. **Congruency and Similarity**: Promotes discussion about

	• More complex constructions		<table><tr><td>**Venn Diagrams**</td><td>Algebra, probability</td><td>Set theory, logic</td><td>Set notation, probability</td></tr><tr><td>**Congruency & Similarity**</td><td>Transformations, angles</td><td>Proof, similarity</td><td>Geometric reasoning, construction</td></tr></table>	geometric properties, reasoning through constructions, and justifying similarity or congruency using mathematical language
Summer - Half Term 6	**Scale Drawings & Bearings** • Use and interpret maps and construct, use and interpret scale drawings • Use compass points and their equivalent Three-figure bearings • Measure and draw diagrams using three-figure bearings to specify direction • Work out the bearing of a point from another given point (reverse bearings) • Apply angle rules in order to work out bearings Extension • Calculate bearings using right angled trigonometry **Plans and Elevations**	As above using the topics on the left	**1. Scale Drawings & Bearings** **Why now?** This topic applies geometry and angle knowledge in real-world contexts such as navigation, mapping, and construction. It reinforces spatial awareness and introduces the use of **direction and scale**. **Why now in the overall sequence?** • Students have already studied **angles**, **congruency**, **similarity**, and **trigonometry**, which are essential for understanding bearings and scale. • They've worked with **proportion** and **compound measures**, which support scale conversions and distance calculations. **Pedagogical benefits:** • Applies geometry to real-life contexts. • Reinforces angle rules and introduces compass-based direction. • Develops precision in drawing and interpreting diagrams. **Links to previous topics:** • **Angles in Polygons**: Angle rules used in bearings	**1. Development of Mathematical Vocabulary** **Scale Drawings & Bearings**: Introduces and reinforces terms such as *scale*, *bearing*, *three-figure bearing*, *compass direction*, *reverse bearing*, and *angle rules*. These terms are essential for interpreting and describing position and direction accurately. **Plans and Elevations**: Builds vocabulary around *elevation*, *plan view*, *net*, *projection*, *cr*

	• Use 2D representations of 3D shapes • Understand and draw front and side elevations and plans of shapes made from simple solids • Analyse 3D shapes through 2D projections and cross sections, including plans and elevations • Draw nets and show how they fold to make a 3D solid		• **Right-Angled Triangles**: Trigonometry for calculating distances and angles • **Proportion**: Scale conversions • **Congruency & Similarity**: Understanding scale and shape preservation **2. Plans & Elevations** **Why now?** Plans and elevations develop students' ability to visualise and interpret 3D shapes from 2D representations. This topic strengthens spatial reasoning and connects to earlier work on surface area, volume, and nets. **Why now in the overall sequence?** • Students have studied **surface area**, **volume**, and **nets**, so they understand the structure of 3D shapes. • They've worked with **transformations** and **constructions**, which support accurate drawing and visualisation. **Pedagogical benefits:** • Enhances spatial awareness and 3D reasoning. • Prepares students for design, architecture, and engineering contexts. • Reinforces understanding of shape properties and dimensions. **Links to previous topics:** • **Surface Area & Volume**: Understanding the structure of 3D shapes • **Transformations**: Visualising movement and orientation • **Congruency & Similarity**: Recognising consistent dimensions and proportions • **Scale Drawings**: Drawing to scale and interpreting dimensions	*oss-section*, and *3D solids*. These terms help students describe spatial relationships and geometric structures clearly. **2. Reading and Interpreting Mathematical Texts and Representations** **Scale Drawings & Bearings**: Students interpret maps, diagrams, and directional instructions. They must understand how to apply scale and measure angles accurately using protractors and compasses. **Plans and Elevations**: Requires interpreting 2D representations of 3D shapes, visualising spatial structures, and translating between different views (e.g. front, side, top). This supports visual literacy and spatial reasoning.

Sequence	Builds On	Prepares For	Key Skills Developed
Scale Drawings & Bearings	Angles, trigonometry, proportion	Navigation, real-world geometry	Direction, measurement, angle rules
Plans & Elevations	Surface area, nets, transformations	3D geometry, design	Spatial reasoning, visualisation

3. Speaking and Listening for Reasoning

Scale Drawings & Bearings: Students explain how they calculated bearings or interpreted directions, justify the use of angle rules, and describe movement or position using precise language.

Plans and Elevations: Encourages discussion about how 3D shapes are represented in 2D, how nets fold into solids, and how to identify features from different views. This promotes clear explanation and collaborative reasoning.