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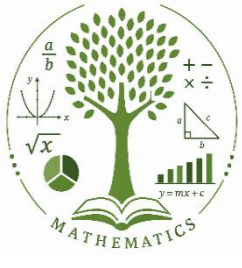
Mathematics Intent	Year 8



Mathematics is a fundamental discipline that develops students' ability to think logically, reason systematically and solve problems with confidence. At Key Stage 3, our curriculum aims to build a deep understanding of mathematical concepts, enabling students to become fluent, independent and resilient mathematicians. Mathematics provides students with the tools to interpret the world around them, make informed decisions and approach challenges with creativity and precision. Through the study of mathematics, students develop not only numerical and analytical skills but also the ability to communicate ideas, justify thinking and recognise patterns and relationships. The KS3 curriculum provides the essential foundations required for further study in mathematics and its applications across science, technology, finance, engineering and everyday life.

The KS3 mathematics curriculum is built around a carefully sequenced body of essential mathematical knowledge. Students develop secure understanding of key concepts including number, algebra, ratio and proportion, geometry, statistics, probability and mathematical reasoning. Students revisit and build upon prior learning through deliberate sequencing, ensuring that foundational knowledge becomes embedded and increasingly sophisticated over time. Key mathematical facts, methods, vocabulary and representations are developed systematically so that students can recall and apply knowledge fluently. The curriculum prioritises conceptual understanding alongside procedural fluency, ensuring students understand not only how to complete a mathematical process but also why methods work and how different areas of mathematics connect.

Mathematical knowledge is developed alongside the skills required to use it effectively. Students are taught to reason, problem-solve, interpret information, communicate mathematical ideas and make connections between different concepts. Students apply their knowledge through increasingly challenging problems that require them to select appropriate strategies, explain their reasoning and evaluate solutions. The curriculum develops mathematical thinking by encouraging students to explore different methods, identify misconceptions and learn from mistakes. By combining knowledge with application, students become flexible mathematicians who can transfer their understanding to unfamiliar contexts rather than relying solely on memorised procedures.

Mathematics is embedded throughout everyday life and plays a crucial role in understanding the world. Students explore how mathematical concepts are used in real-world situations, including managing money, analysing data, interpreting information, measuring, designing, modelling and making predictions. The curriculum highlights the importance of mathematics beyond the classroom by demonstrating its relevance to future careers and wider society. Students are encouraged to recognise mathematics as a powerful tool for decision-making, problem-solving and innovation.

Our mathematics curriculum is designed to ensure all students can experience success and develop confidence as mathematicians. Lessons are carefully structured to provide appropriate challenge and support, allowing all students to access ambitious mathematical learning. Teachers use a range of strategies including explicit instruction, carefully chosen representations, worked examples, mathematical vocabulary development and opportunities for guided practice. Common misconceptions are anticipated and addressed to support students in developing secure understanding. Students with different starting points are supported through adaptive teaching approaches, while all learners are encouraged to develop independence, resilience and a positive mathematical mindset. Accessibility is embedded through clear explanations, multiple representations and opportunities for every student to participate meaningfully.

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	The KS3 curriculum allows students to experience a broad set of courses that develop curiosity and appreciation of mathematics. Opportunities for investigation, problem-solving and exploring real-life applications help students see mathematics as a creative and valuable subject, links to real-world mathematics and exploration of the role of mathematics in different careers and disciplines. Students develop appreciation of mathematics as a subject that is both practical and intellectually stimulating. The curriculum encourages students to see mathematics as a connected subject, where ideas from different areas combine to solve complex problems. By the end of KS3, students will have developed a strong mathematical foundation that prepares them for further study and life beyond school. They will have the knowledge, skills and confidence to approach mathematical challenges with resilience and independence. Students will leave KS3 able to reason mathematically, solve problems effectively, communicate their ideas clearly and apply their understanding to new situations. The curriculum aims to create capable, confident mathematicians who recognise the value of mathematics and are equipped to use it throughout their future education, careers and everyday lives.

Term 1 Topic	**Rounding and Estimation** **Sequences**

Big Picture
What are the main ideas and big questions in this topic?

Students develop their understanding of how numbers can be approximated, represented and analysed accurately. They investigate rounding and estimation as essential mathematical tools for checking the reasonableness of answers, making informed decisions and solving problems efficiently. Alongside this, students explore sequences, recognising patterns, describing relationships and predicting future terms using mathematical reasoning.
Throughout the topic, students strengthen their confidence in identifying numerical patterns, applying efficient strategies and communicating mathematical thinking clearly. These concepts provide an important foundation for algebra, graph work and problem solving throughout Key Stage 3 and beyond.

- Why do we round numbers and when is estimation useful?
- How can we decide the appropriate level of accuracy?
- How can we check if an answer is reasonable?
- What patterns and relationships can we find in sequences?
- How can we describe and predict the next terms in a sequence?
- How can sequences help us understand patterns in mathematics and the real world?

Zoom In
What knowledge, skills and key vocabulary will we learn step by step?

Students begin by developing their understanding of rounding and estimation. They revisit place value before applying rounding to decimal places and significant figures, using mixed rounding strategies to solve problems accurately. They investigate estimation techniques, apply these to calculations and use estimation to check whether answers are reasonable and appropriate in different mathematical contexts.

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Building on this understanding, students explore sequences by recognising, continuing and generating number patterns. They investigate linear sequences, identify the term-to-term rule, describe relationships between terms and calculate the nth term of a sequence. Throughout the topic, students identify patterns, make predictions and explain the mathematical reasoning behind their methods.

Students develop substantive knowledge by understanding place value, rounding to decimal places and significant figures, estimation techniques, the purpose of approximation, and the structure of linear sequences, including the relationship between terms and the nth term. Alongside this, students strengthen their disciplinary knowledge by selecting appropriate rounding and estimation strategies, checking the reasonableness of answers, recognising and extending patterns, identifying sequence rules, making mathematical generalisations and explaining their reasoning using precise mathematical vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including estimate, approximation, decimal place, significant figure, rounding, place value, sequence, pattern, term, rule, linear sequence, nth term, difference, predict, generate, generalise and reasoning.

Pre-Requisite Knowledge
What have we already learned that will help us with this topic?

Students will build on their understanding of place value, number size, the four operations and patterns. Their knowledge of digits, decimals and comparing numbers will support accurate rounding and estimation.

Students' previous work with number sequences, patterns, arithmetic operations and algebraic thinking will help them identify rules, describe relationships and extend sequences.

Pitch Up
How will we challenge ourselves?

Students will be challenged through reasoning and problem-solving tasks that require them to make decisions about accuracy and justify their choices. They will explain why a particular rounding method is appropriate and evaluate the effect of approximation.

For sequences, students will explore more complex patterns, identify general rules, find unknown terms and link sequences to algebra. They will be encouraged to explain their thinking and apply their knowledge to unfamiliar contexts.

Wider Framework
How does this learning connect to future topics and bigger goals?

Rounding and estimation develop students' ability to work accurately, judge the reasonableness of answers and make informed decisions. These skills support future learning in algebra, statistics, measurement, probability and problem-solving.

Sequences provide an important foundation for algebra by helping students recognise patterns, describe relationships and develop general rules. This prepares students for studying functions, graphs, equations and mathematical modelling.

Curriculum Hinterland
What wider knowledge will deepen our understanding of this topic?

Students will deepen their understanding by exploring how estimation and sequences are used in real-life situations, such as financial planning, data analysis, scientific measurements, population patterns and technology.

Links to other subjects such as science (measurement and accuracy), computing (patterns and algorithms), geography (data trends) and economics (prediction and modelling) show how mathematics helps us analyse information and identify patterns in the world around us.

Students develop wider skills including critical thinking, accuracy, problem-solving and perseverance by evaluating information and explaining mathematical reasoning.

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Authentic connections
How does this topic connect to real life, careers, other subjects and important values?

Rounding, estimation and sequences are used regularly in everyday life when interpreting measurements, checking calculations, managing money and identifying trends within data. Understanding these concepts helps students make informed decisions and appreciate how mathematics is used to solve practical problems. SMSC is developed through resilience, logical thinking and perseverance as students evaluate methods, identify patterns and justify mathematical reasoning. Students learn that different approaches can often lead to the same correct solution.

Cross-curricular links include Science through measurement and accuracy, Computing through algorithms and coding patterns, Geography through interpreting numerical data, and Business through estimation and financial calculations.

Students explore careers including:

- Software Developer – identifying patterns and creating logical algorithms.
- Logistics Planner – using estimation and numerical reasoning to organise transport and resources efficiently.
- Operations Manager – applying estimation, forecasting and pattern recognition to support business planning.

The topic supports the Skills Builder Universal Framework, particularly:

- Planning through selecting appropriate estimation and rounding strategies.
- Listening through evaluating mathematical explanations and responding to feedback.
- Problem Solving through recognising patterns, generating sequence rules and applying estimation in unfamiliar contexts.

Resources
What books, websites, videos and materials will support our learning?

- Corbett Maths
- SPARXmaths.com
- BBC Bitesize

Assessment
How will we show what we know, remember and can apply?

Assessment includes questioning, class discussions, independent practice, problem-solving activities and recall of key vocabulary, methods and procedures relating to rounding, estimation and sequences. Students demonstrate their understanding by applying rounding strategies accurately, estimating effectively, identifying sequence rules and explaining their reasoning using appropriate mathematical vocabulary.
The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of rounding, estimation and sequences whilst applying mathematical reasoning, selecting efficient strategies, identifying patterns and solving unfamiliar mathematical problems.

Term 2 Topic	**Graphical representations of linear relationships** **Introduction to Algebra**

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Big Picture
What are the main ideas and big questions in this topic?

Students develop their understanding of how mathematical relationships can be represented using graphs and algebra. They investigate how graphs communicate patterns and relationships between variables before exploring how algebra provides a powerful mathematical language for representing, simplifying and solving problems. Throughout the topic, students strengthen their confidence in recognising patterns, representing mathematical relationships and solving increasingly complex problems. By linking graphical representations with algebraic thinking, students develop the reasoning skills needed to communicate mathematical ideas clearly and apply them in a range of contexts.

- How can we represent relationships between two variables?
- What does a graph tell us about a mathematical relationship?
- How can we recognise and describe linear patterns?
- How do tables, graphs and equations connect?
- Why do we use letters and symbols in algebra?
- How can algebra help us represent and solve real-life problems?

Zoom In
What knowledge, skills and key vocabulary will we learn step by step?

Students begin by exploring graphical representations of linear relationships, learning how to interpret and construct graphs accurately. They investigate coordinates, axes, scales and gradients before plotting linear graphs and identifying the relationships they represent. Students develop confidence in interpreting information from graphs, recognising patterns and using graphical representations to solve problems. Building upon this understanding, students are introduced to algebraic notation and manipulation. They investigate expressions, substitution, collecting like terms, expanding brackets and forming equations before solving increasingly complex algebraic problems. Throughout the topic, students recognise algebra as a way of representing mathematical relationships, identifying patterns and communicating general rules.

Students develop substantive knowledge by understanding how graphs represent relationships between variables, recognising the features of linear graphs, understanding algebraic notation, expressions, equations and the rules used to simplify and manipulate algebraic expressions. Alongside this, students strengthen their disciplinary knowledge by interpreting and constructing graphs accurately, selecting appropriate algebraic methods, representing mathematical situations symbolically, identifying patterns and relationships, solving equations logically and explaining mathematical reasoning using precise vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including coordinate, axis, graph, scale, gradient, linear, variable, expression, equation, substitute, simplify, coefficient, term, collect, expand, solve, unknown, relationship, represent, pattern and reasoning.

Pre-Requisite Knowledge
What have we already learned that will help us with this topic?

Students build upon their understanding of arithmetic procedures, number properties, sequences and coordinates developed during Year 7. Previous learning about patterns, place value and calculation provides the foundation for representing

Pitch Up
How will we challenge ourselves?

Students will be challenged through reasoning and problem-solving tasks that require them to interpret, compare and explain relationships shown in graphs, tables and equations.

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relationships graphically and using algebra to describe and solve mathematical problems.	They will explore more complex linear relationships, identify patterns, make predictions and connect different representations. Students will justify their methods, explain their thinking and apply algebra to unfamiliar and real-world contexts.
Wider Framework How does this learning connect to future topics and bigger goals?	**Curriculum Hinterland** What wider knowledge will deepen our understanding of this topic?
This learning provides the foundation for future work in algebra, graphs, equations, functions and mathematical modelling. Understanding linear relationships helps students explore more complex patterns, solve problems and represent relationships between quantities. Algebraic thinking supports future topics such as simultaneous equations, inequalities, sequences and advanced problem-solving.	Students will deepen their understanding by exploring how graphs and algebra are used to represent real-world situations such as finance, science, technology and business. Links to subjects such as computing (algorithms and coding), science (formulas and relationships), geography (data trends) and economics (growth and change) help students understand how mathematics can be used to analyse information, make predictions and solve problems.

Authentic connections
How does this topic connect to real life, careers, other subjects and important values?

Graphs and algebra are used every day to represent information, identify trends and solve problems. From interpreting financial data and scientific investigations to developing computer programs and analysing business performance, these mathematical ideas help people understand relationships and make informed decisions. SMSC is developed through resilience, logical reasoning and critical thinking as students evaluate methods, justify mathematical conclusions and appreciate that different approaches can often lead to the same solution.

Cross-curricular links include Science through experimental graphs and formulae, Computing through programming and algorithms, Geography through data interpretation and graphs, and Business through financial modelling and trend analysis.

Students explore careers including:

- Robotics Engineer – using algebra, graphs and mathematical modelling to design and programme automated systems.
- Transport Planner – analysing graphs, modelling journeys and using mathematical relationships to improve transport networks.
- Artificial Intelligence (AI) Engineer – applying algebraic thinking and mathematical models to develop intelligent computer systems.

The topic supports the Skills Builder Universal Framework, particularly:

- Speaking through explaining mathematical reasoning using precise language.
- Problem Solving through interpreting graphs and solving algebraic problems.
- Creativity through representing mathematical relationships in different ways and identifying patterns.

Resources What books, websites, videos and materials will support our learning?	**Assessment** How will we show what we know, remember and can apply?

○ Corbett Maths ○ BBC bitesize ○ SPARXmaths.com	Assessment includes questioning, class discussions, independent practice, problem-solving activities and recall of key vocabulary, methods and procedures relating to graphs and algebra. Students demonstrate their understanding by constructing and interpreting graphs, simplifying expressions, solving equations and applying algebraic reasoning to increasingly challenging problems. The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of graphical representations and algebraic methods whilst applying mathematical reasoning, selecting efficient strategies, interpreting relationships and communicating their thinking using precise mathematical vocabulary.

Term 3
Topic

Understanding multiplicative relationships: percentages and proportionality

Big Picture
What are the main ideas and big questions in this topic?

Students develop their understanding of multiplicative relationships by exploring how percentages, fractions, decimals and ratio can be used to compare quantities, describe proportional change and solve mathematical problems. They investigate how these different representations are connected, building confidence in selecting the most appropriate methods for a range of calculations and real-life situations. Throughout the topic, students strengthen their proportional reasoning by recognising how quantities change, applying multipliers accurately and solving increasingly complex problems involving ratio and proportion. These concepts provide an important foundation for future learning in algebra, similarity, probability, financial mathematics and mathematical modelling.

- What does it mean for one quantity to be a multiple of another?
- How can we describe how quantities change relative to each other?
- Why are percentages useful for comparing quantities?
- How are fractions, decimals and percentages connected?
- How can we use multipliers to represent increases and decreases?
- How can we tell whether a relationship is proportional?
- Why does proportional reasoning help us make predictions?
- How can we distinguish between additive change and multiplicative change?
- How can we use proportionality to solve unfamiliar problems?
- How do different representations help us understand the same relationship?

Zoom In
What knowledge, skills and key vocabulary will we learn step by step?

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Students begin by developing their understanding of multiplicative relationships, exploring the connections between fractions, decimals and percentages (FDP) before calculating percentages of amounts using both standard methods and multipliers. They investigate percentage increase and decrease using calculator and non-calculator methods, apply these techniques to real-life percentage problems and develop confidence when solving reverse percentage calculations. Building upon this understanding, students investigate ratio and proportion. They write ratios from given contexts, simplify ratios involving two or more quantities, compare best-buy problems, share quantities in a given ratio and work backwards from ratio information. Students then develop their understanding of direct proportion and inverse proportion, interpreting proportional relationships from tables and solving increasingly complex proportional reasoning problems.

Students develop substantive knowledge by understanding the relationships between fractions, decimals, percentages and ratio, recognising multiplicative relationships, understanding proportional change, applying percentage calculations accurately and recognising when quantities are directly or inversely proportional. Alongside this, students strengthen their disciplinary knowledge by selecting appropriate calculation methods, applying proportional reasoning to unfamiliar contexts, interpreting mathematical relationships, comparing different strategies, justifying solutions using accurate mathematical vocabulary and solving multi-step problems involving percentages, ratio and proportion.

Pre-Requisite Knowledge
What have we already learned that will help us with this topic?

Students should already have a secure understanding of multiplication and division facts, including times tables and the idea of factors and multiples. They will have experience working with fractions as parts of a whole and be able to recognise equivalent fractions and simplify where appropriate. They should understand decimals and place value, including ordering and rounding numbers. Students will also have met basic percentage ideas such as finding simple percentages and linking these to fractions and decimals. In addition, they will have explored ratio in simple contexts and have some experience with scaling in measurement or geometry. This foundation supports their move into more formal proportional reasoning and percentage change.

Pitch Up
How will we challenge ourselves?

Students will be challenged by being pushed beyond procedural fluency into deeper reasoning about structure and relationships. They will be expected to justify why methods work, not just apply them, and to compare multiple strategies for efficiency and accuracy. Problems will include non-routine and multi-step contexts where the method is not immediately obvious, requiring students to choose between fractions, percentages, ratios or multipliers. They will explore both proportional and non-proportional situations, including misleading contexts where additive reasoning might seem plausible but fails. Students will also be challenged to generalise patterns, express relationships algebraically, and interpret graphs and data to make predictions. Higher-attaining students will be encouraged to explain proofs of proportionality, work backwards from outcomes, and solve inverse problems involving missing values or original quantities.

Wider Framework
How does this learning connect to future topics and bigger goals?

Understanding multiplicative relationships, percentages and proportionality provides a foundation for many areas of mathematics. Students will use this knowledge in future topics including algebra, where they will represent relationships using equations, functions and graphs. Proportional reasoning supports understanding of linear relationships, gradients, similarity, scale drawings, probability, statistics and financial mathematics. It also develops students' ability to reason about change, make predictions and interpret real-world information. Beyond mathematics, these

Curriculum Hinterland
What wider knowledge will deepen our understanding of this topic?

Students' understanding is strengthened by connecting percentages and proportionality to real-life contexts such as finance, science, geography and technology. Knowledge of place value, fractions, decimals, ratio and algebra helps students see the links between different mathematical representations. Understanding how quantities change in real situations, such as population growth, speed, probability or financial change, deepens their appreciation of why proportional reasoning is a powerful tool for describing and predicting relationships.

skills are essential for making sense of rates, comparisons, growth, discounts, interest, data and decision-making in everyday life.

Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding multiplicative relationships, percentages and proportionality helps students make sense of many everyday situations, including shopping discounts, budgeting, savings, taxation, recipes, measurements and interpreting data. These concepts enable students to compare options, evaluate information and make informed decisions using mathematical evidence. SMSC is developed through resilience, logical reasoning and critical thinking as students compare strategies, justify solutions and recognise that mathematical problems can often be solved using different approaches.

Cross-curricular links include Science through concentration and scale, Geography through population change and data interpretation, Business through finance and profit, and Food Technology through ratio and scaling recipes.

Students explore careers including:

- Investment Analyst – using percentages and proportional reasoning to evaluate financial performance and risk.
- Supply Chain Manager – applying ratio, scaling and proportional thinking to manage stock, transport and distribution efficiently.
- Nutritionist – using ratios, percentages and proportional calculations to analyse diets and recommend healthy eating plans.

The topic supports the Skills Builder Universal Framework, particularly:

- Teamwork through discussing strategies and comparing mathematical approaches.
- Problem Solving through applying percentages, ratio and proportion to unfamiliar contexts.
- Planning through selecting efficient methods for solving multi-step proportional reasoning problems.

Resources

What books, websites, videos and materials will support our learning?

- Corbett Maths
- BBC Bitesize
- SPARXmaths.com

Assessment

How will we show what we know, remember and can apply?

Assessment includes questioning, class discussions, independent practice, problem-solving activities and recall of key vocabulary, methods and procedures relating to percentages, fractions, decimals, ratio and proportional reasoning. Students demonstrate their understanding by solving percentage problems, applying ratio and proportion, selecting efficient strategies and explaining their reasoning using precise mathematical vocabulary.

The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of multiplicative relationships, percentages and proportionality whilst applying mathematical reasoning, interpreting proportional relationships and solving unfamiliar mathematical problems.

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Term 4 Topic	**6. Statistical representations, measures and analysis**

Big Picture
What are the main ideas and big questions in this topic?

Students develop their understanding of statistics by investigating how data can be collected, represented, interpreted and analysed to answer questions about the world around us. They learn how different statistical representations communicate information and how measures of average and spread help identify patterns, trends and relationships within data. Throughout the topic, students strengthen their confidence in selecting appropriate statistical methods, interpreting evidence critically and drawing justified conclusions. By analysing real-life data, students recognise how statistics support decision making across a wide range of contexts and prepare them for future study in mathematics and other disciplines.

- How can data be collected, organised and represented effectively?
- Which statistical representation is most suitable for different types of data?
- What can measures such as mean, median, mode and range tell us?
- How can we use data to identify patterns and make comparisons?
- How can statistics help us make informed decisions?
- How do we know whether conclusions drawn from data are reliable?

Zoom In
What knowledge, skills and key vocabulary will we learn step by step?

Students begin by developing their understanding of statistical representations, learning to draw and interpret scatter graphs, identify and describe linear correlation, and draw and use a line of best fit. They investigate different types of data before reading and interpreting both ungrouped and grouped frequency tables, recognising how different forms of representation communicate information effectively. Building upon this understanding, students explore measures of average and spread by calculating the mean, median, mode and range from lists of numbers and frequency tables. They compare different averages, identify appropriate measures for different situations and investigate how a given mean, median, mode or range can be used to identify possible sets of data.

Students then apply this knowledge by interpreting and constructing a range of statistical diagrams, including bar charts, pie charts, line graphs and frequency tables, before analysing real-life statistical information to identify patterns, trends and relationships. Students develop substantive knowledge by understanding different types of data, recognising how statistical diagrams represent information, understanding measures of average and spread, interpreting correlation and recognising how statistical methods can be used to compare data sets.

Alongside this, students strengthen their disciplinary knowledge by selecting appropriate methods of representation, interpreting graphs and tables critically, comparing data using statistical measures, identifying trends and relationships, evaluating conclusions and communicating statistical reasoning using precise mathematical vocabulary.

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Key vocabulary is introduced and revisited throughout the topic, including data, discrete, continuous, frequency, grouped data, ungrouped data, scatter graph, correlation, positive correlation, negative correlation, line of best fit, mean, median, mode, range, average, bar chart, pie chart, line graph, frequency table, trend, compare, interpret, analyse and conclusion.

Pre-Requisite Knowledge
What have we already learned that will help us with this topic?

Students will build on their understanding of number skills, including calculation methods, averages and interpreting information. Their knowledge of fractions, decimals and percentages will support understanding data, comparisons and statistical measures.

Students' previous experience of reading tables, graphs, coordinates and patterns will help them interpret and create statistical representations. They will use their problem-solving and reasoning skills to analyse information and draw conclusions.

Pitch Up
How will we challenge ourselves?

Students will be challenged through tasks that require them to interpret, compare and evaluate data rather than simply calculate answers. They will justify which statistical methods and representations are most appropriate and explain the conclusions they can or cannot make.

Students will explore more complex data sets, identify misleading representations, analyse trends and apply statistical thinking to real-world contexts.

Wider Framework
How does this learning connect to future topics and bigger goals?

This learning provides the foundation for future work in statistics, probability, data analysis and interpreting information. Understanding how data is represented and analysed helps students make comparisons, identify patterns and evaluate evidence. Statistical knowledge supports future learning in topics such as probability, sampling, averages, graphs and more advanced data analysis. It develops students' ability to reason, question information and make informed decisions.

Curriculum Hinterland
What wider knowledge will deepen our understanding of this topic?

Students will deepen their understanding by exploring how statistics are used in real-life contexts such as surveys, research, sport, finance, health, business and the media.
Links to other subjects such as science (experiments and results), geography (population and environmental data), computing (data handling and analysis) and economics (trends and predictions) show how statistics are used to interpret the world around us.
Students develop important values including critical thinking, accuracy and curiosity by learning to question data, recognise patterns and make evidence-based conclusions.

Authentic connections
How does this topic connect to real life, careers, other subjects and important values?

Statistics are used every day to understand information, compare data, identify trends and support decision making. Whether analysing sports performance, interpreting medical research, investigating climate data or evaluating public opinion, statistical reasoning enables people to make evidence-based judgements. SMSC is developed through critical thinking, resilience and intellectual curiosity as students evaluate evidence, question conclusions and recognise that data can sometimes be interpreted in different ways.

Cross-curricular links include Science through experimental data and investigations, Geography through population and environmental data, Computing through data handling and analysis, and Business through market research and financial trends.

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Students explore careers including:

- Epidemiologist – analysing health data to understand and prevent the spread of disease.
- Sports Performance Analyst – using statistics to evaluate player and team performance.
- Demographer – interpreting population data to support planning and public policy.

The topic supports the Skills Builder Universal Framework, particularly:

- Listening through interpreting evidence and evaluating different conclusions drawn from data.
- Leadership through presenting and defending evidence-based statistical conclusions.
- Problem Solving through selecting appropriate statistical methods to analyse unfamiliar data sets.

Resources What books, websites, videos and materials will support our learning?	**Assessment** How will we show what we know, remember and can apply?
○ Corbett Maths ○ BBC Bitesize ○ SPARXmaths.com	Assessment includes questioning, class discussions, independent practice, problem-solving activities and recall of key vocabulary, statistical methods and representations. Students demonstrate their understanding by constructing and interpreting graphs, calculating and comparing averages, identifying trends and relationships, and drawing justified conclusions from a range of statistical data. The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of statistical representations, measures and analysis whilst applying mathematical reasoning, interpreting evidence critically, selecting appropriate methods and communicating conclusions using precise mathematical vocabulary.

Term 5

Topic/Theme/Enquiry

Perimeter, Area and Volume

Big Picture

What are the main ideas and big questions in this topic?

Students develop their understanding of measurement by exploring how perimeter, area and volume can be used to describe, compare and solve problems involving two-dimensional and three-dimensional shapes. They investigate how different formulae are derived and applied, recognising that accurate measurement is fundamental to mathematics and many real-world contexts. Throughout the topic, students strengthen their confidence in selecting appropriate methods, applying formulae accurately and reasoning about the properties of shapes.

These concepts provide important foundations for future learning in geometry, trigonometry, algebra and mathematical modelling.

- What is the difference between length, area and volume?
- How do we measure and compare the size of shapes and objects?
- Why do different measurements require different units?

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- How are perimeter, area and volume connected to the dimensions of a shape?
- How can we derive and use formulas rather than just memorise them?
- How does changing one dimension affect the perimeter, area or volume?
- Why do similar shapes have different relationships between length, area and volume?
- How can we use measurement to solve real-world problems?
- How can diagrams, nets and representations help us understand 2D and 3D space?

Zoom In
What knowledge, skills and key vocabulary will we learn step by step?

Students begin by developing their understanding of perimeter and area, calculating the perimeter of rectangles, compound shapes and polygons before applying formulae to find the area of rectangles, triangles, parallelograms, trapezia and compound shapes. They compare different methods, select efficient strategies and explain how the properties of shapes influence the calculations they perform. Building upon this understanding, students investigate volume and surface area by calculating the volume of cubes, cuboids and prisms before exploring surface area through increasingly complex three-dimensional shapes. They interpret dimensions accurately, apply mathematical formulae and solve practical problems involving measurement in a range of contexts.

Students develop substantive knowledge by understanding the difference between perimeter, area, surface area and volume, recognising the properties of two-dimensional and three-dimensional shapes, knowing the formulae required for different calculations and understanding the relationship between units of length, area and volume. Alongside this, students strengthen their disciplinary knowledge by selecting appropriate formulae, applying measurement skills accurately, interpreting dimensions, solving multi-step problems, reasoning mathematically about shape and space, and communicating solutions using precise mathematical vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including perimeter, area, volume, surface area, rectangle, triangle, parallelogram, trapezium, compound shape, prism, cuboid, cube, dimensions, length, width, height, formula, square units, cubic units, calculate, estimate and measure.

Pre-Requisite Knowledge
What have we already learned that will help us with this topic?

Students should already have an understanding of basic 2D and 3D shape properties, including recognising common shapes and identifying their features. They will have experience measuring length using standard units and converting between simple units of measurement. Students should know multiplication and division facts, as these support calculating perimeter, area and volume. They will have previously explored fractions, decimals and estimation, which help with accuracy and checking answers. Students will also have encountered simple area and perimeter calculations and will build on this by applying formulas, reasoning and problem-solving strategies to more complex shapes and contexts.

Pitch Up
How will we challenge ourselves?

Students will be challenged by moving beyond simply recalling formulas and developing a deeper understanding of why methods work. They will solve multi-step problems involving compound shapes, missing dimensions and unfamiliar contexts where they must decide which measurements and strategies are needed. Students will explore how changing dimensions affects perimeter, area and volume, making links to scaling and proportional reasoning. They will compare different methods, justify their choices and explain their reasoning using accurate mathematical language. Higher-attaining students will be challenged to derive formulas, investigate patterns, solve reverse problems and apply their understanding to complex real-life scenarios involving design, construction and optimisation.

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Wider Framework How does this learning connect to future topics and bigger goals?	**Curriculum Hinterland** What wider knowledge will deepen our understanding of this topic?
Understanding perimeter, area and volume provides a foundation for many future areas of mathematics, including geometry, algebra, trigonometry, similarity, scale factors and coordinate geometry. Students will use these ideas when working with formulas, rearranging equations and solving problems involving unknown measurements. Measurement skills are essential for understanding space, shape and proportion, and they support more advanced mathematical thinking such as modelling, reasoning and problem-solving. This knowledge also helps students interpret and solve real-world problems involving design, construction, engineering, architecture and everyday decision-making.	Students' understanding is strengthened by connections to other areas such as fractions, decimals, ratios and proportionality, which help explain how measurements change. Knowledge of algebra allows students to represent relationships between dimensions and measurements using symbols and equations. Links to science, geography, technology and art help students see how area, surface area and volume are used to measure, compare and model the world around them. Understanding units, accuracy and estimation also develops students' ability to make sensible judgements and apply mathematics in practical contexts.

Authentic connections
How does this topic connect to real life, careers, other subjects and important values?

Understanding perimeter, area and volume helps students solve everyday problems involving measurement, planning and design. These concepts are used when estimating materials, designing spaces, packaging products and calculating capacity, helping students appreciate the practical value of mathematics beyond the classroom. SMSC is developed through resilience, precision and logical reasoning as students apply formulae accurately, evaluate different methods and recognise the importance of accuracy when solving real-world problems.

Cross-curricular links include Science through practical measurement and density, Design Technology through designing and manufacturing products, Geography through map scale and land measurement, and Construction through planning and estimating materials.

Students explore careers including:

- Construction Project Manager – planning building projects using accurate measurements, area and volume calculations.
- Interior Designer – calculating floor areas, room layouts and material requirements.
- Packaging Designer – using surface area and volume to create efficient, sustainable packaging solutions.

The topic supports the Skills Builder Universal Framework, particularly:

- Planning through selecting appropriate methods and formulae for multi-step measurement problems.
- Teamwork through discussing strategies and comparing different mathematical approaches.
- Problem Solving through applying perimeter, area and volume to unfamiliar mathematical and real-world contexts.

Resources What books, websites, videos and materials will support our learning?	**Assessment** How will we show what we know, remember and can apply?
○ Corbett Maths ○ BBC Bitesize ○ SPARXmaths.com	Assessment includes questioning, class discussions, independent practice, problem-solving activities and recall of key vocabulary, methods and formulae relating to perimeter, area and volume. Students demonstrate their understanding by selecting

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	appropriate formulae, completing accurate calculations and applying measurement skills to increasingly challenging geometrical contexts. The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of perimeter, area and volume whilst applying mathematical reasoning, selecting efficient strategies, interpreting measurements accurately and communicating their thinking using precise mathematical vocabulary.

Term 6 Topic		**Geometrical Properties: Polygons** **Constructions**

Big Picture
What are the main ideas and big questions in this topic?

Students develop their understanding of geometry by exploring the properties and relationships of polygons and applying angle rules to solve increasingly complex problems. They investigate how shapes can be classified, compared and described using sides, angles and symmetry, recognising that geometric relationships provide a logical framework for understanding space and shape. Alongside this, students develop accuracy and precision through geometric constructions, learning how mathematical tools and techniques are used to create precise diagrams. They apply construction methods to solve problems, communicate mathematical ideas clearly and appreciate how geometry underpins many aspects of design, engineering and technology.

Throughout the topic, students consider the following enquiry questions:

- How can we classify and describe different polygons?
- What properties do shapes share and how are they different?
- How do angles and sides help us understand geometric relationships?
- Why are accurate constructions important in mathematics and real life?
- How can geometric tools and methods help us solve problems?
- How can we use shapes and constructions to design, create and analyse objects?

Zoom In
What knowledge, skills and key vocabulary will we learn step by step?

Students begin by investigating the geometrical properties of polygons. They apply angle rules involving angles at a point, angles on a straight line, vertically opposite angles, angles in triangles and quadrilaterals, angles in parallel lines, angles and algebra, angles in polygons, and interior and exterior angles. Throughout the topic, students classify and compare shapes, apply geometric reasoning, explain properties using precise mathematical language and solve increasingly complex problems involving polygons. Students develop substantive knowledge by understanding the properties of two-dimensional shapes and how polygons are classified, recognising the differences between regular and irregular polygons, understanding the relationships between sides, vertices, angles and symmetry, knowing the angle properties of triangles, quadrilaterals and other polygons, and understanding how geometric properties can be used to describe and compare shapes.

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Alongside this, students strengthen their disciplinary knowledge by classifying and comparing polygons using mathematical properties, applying angle rules to solve geometric problems, reasoning about relationships between shapes, explaining solutions using accurate mathematical vocabulary and applying their understanding of polygons to real-world design and measurement problems. Building upon this understanding, students investigate geometric constructions by accurately drawing triangles using a ruler, pair of compasses and protractor (SSS and SAS constructions) before constructing perpendicular bisectors and angle bisectors. Through these activities, students develop increasing confidence in using mathematical equipment accurately whilst following precise geometric procedures.

Students develop substantive knowledge by understanding that constructions are accurate geometric drawings created using mathematical tools, knowing the purpose and methods of constructing lines, angles and shapes, understanding perpendicular and angle bisectors, recognising how circles and arcs are used in construction and appreciating the importance of accuracy and precision within geometry. Their disciplinary knowledge is strengthened by using rulers, compasses and protractors accurately, following construction methods systematically, creating precise geometric diagrams, explaining and justifying construction techniques and applying construction methods to solve increasingly complex geometric problems.

Key vocabulary is introduced and revisited throughout the topic, including polygon, regular, irregular, side, vertex, angle, interior angle, exterior angle, triangle, quadrilateral, pentagon, hexagon, symmetry, parallel, perpendicular, congruent, construction, compass, ruler, protractor, arc, bisector, midpoint, line segment, radius, circle, accuracy and scale.

Pre-Requisite Knowledge
What have we already learned that will help us with this topic?

Geometrical Properties: Polygons
Students should already have knowledge of common 2D shapes and their properties, including names, sides, angles and symmetry. They will have explored regular and irregular polygons, angle facts and relationships between shapes. This understanding supports their ability to classify shapes, reason about their properties and apply geometric rules when solving problems involving angles, transformations and constructions.

Constructions
Students should already have experience using mathematical equipment accurately, including rulers, compasses and protractors. They will have developed skills in drawing accurate lines, measuring angles, constructing shapes and following step-by-step geometric methods. This foundation supports more advanced construction work, where precision, understanding of geometric properties and logical reasoning are required.

Pitch Up
How will we challenge ourselves?

Students will be challenged by moving beyond recognising properties and carrying out procedures to explaining why constructions and geometric rules work. They will solve problems where they must use multiple properties of polygons together, reason from diagrams, and justify their conclusions using mathematical language. Students will explore more complex constructions, investigate relationships between angles and shapes, and apply their knowledge to unfamiliar problems. Higher-attaining students will be challenged to prove geometric relationships, identify patterns and create their own constructions based on given conditions.

Wider Framework
How does this learning connect to future topics and bigger goals?

Curriculum Hinterland
What wider knowledge will deepen our understanding of this topic?

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Understanding the properties of polygons and geometric constructions provides a foundation for future topics including angles, transformations, similarity, congruence, scale factors, coordinates, trigonometry and proof. Students will use their knowledge of shape properties and accurate construction techniques to reason about geometric relationships, solve complex problems and develop mathematical arguments. This learning supports the development of spatial reasoning, logical thinking and the ability to represent and analyse shapes in different contexts.	Students' understanding is strengthened by connections to algebra, measurement and proportional reasoning, where shapes and their properties are described using mathematical relationships. Links to science, engineering, architecture, art and design show how geometric principles are used to create, model and analyse structures. Developing accuracy, precision and reasoning helps students understand that geometry is not just about drawing shapes, but about explaining and proving why relationships between shapes exist.

Authentic connections

How does this topic connect to real life, careers, other subjects and important values?

Understanding polygons and geometric constructions enables students to recognise patterns, design accurately and solve practical problems involving shape, measurement and space. These concepts are used widely in construction, manufacturing, digital design and engineering, where precision and logical reasoning are essential. SMSC is developed through resilience, accuracy and logical thinking as students justify geometric reasoning, evaluate different methods and appreciate the importance of precision when solving mathematical problems.

Cross-curricular links include Art and Design through symmetry, pattern and composition, Design Technology through technical drawing and construction, Geography through mapping and scale, and Computing through graphics, modelling and computer-aided design.

Students explore careers including:

- Aerospace Engineer – applying geometric principles when designing aircraft and spacecraft.
- Urban Planner – using geometric reasoning and scale to design towns, transport networks and public spaces.
- Animation Designer – applying transformations, symmetry and geometric modelling to create digital animations and visual effects.

The topic supports the Skills Builder Universal Framework, particularly:

- Creativity through visualising geometric relationships and constructing accurate diagrams.
- Planning through selecting appropriate construction methods and solving multi-step geometric problems.
- Speaking through explaining geometric reasoning and justifying mathematical conclusions using precise vocabulary.

Resources

What books, websites, videos and materials will support our learning?

- Corbett Maths
- BBC Bitesize
- SPARXmaths.com

Assessment

How will we show what we know, remember and can apply?

Assessment includes questioning, class discussions, independent practice, problem-solving activities and recall of key vocabulary, methods and geometric rules relating to polygons and constructions. Students demonstrate their understanding by classifying shapes, applying angle rules, completing accurate geometric constructions and explaining their reasoning using precise mathematical language.

	The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of polygons, angle relationships and geometric constructions whilst applying mathematical reasoning, selecting appropriate strategies, communicating their thinking clearly and solving unfamiliar geometric problems.