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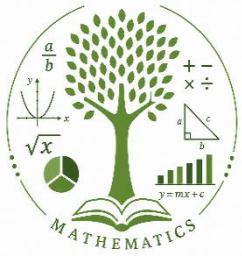
Mathematics Intent	Year 7
	Mathematics is a fundamental discipline that develops students' ability to think logically, reason systematically and solve problems with confidence. At Key Stage 3, our curriculum aims to build a deep understanding of mathematical concepts, enabling students to become fluent, 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.

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	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. 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	1. **Place Value** 2. **Properties of Numbers: factors, multiples, squares and cube**

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

Students develop a secure understanding of how numbers are structured and how their properties affect the way they are used. They explore the importance of place value, the size and value of digits, and the relationships between different types of numbers, including factors, multiples, square numbers and cube numbers. Throughout the topic, students build confidence in representing, comparing and manipulating numbers accurately. This secure understanding of number forms the foundation for future mathematical learning, supporting success in calculation, algebra, ratio, geometry, probability and statistics throughout Key Stage 3 and beyond.

- Does the position of a digit affect its value?
- How can we represent and compare numbers in different ways?
- What patterns and relationships exist between numbers?
- How do we identify and use factors and multiples?
- Why are square and cube numbers important in mathematics?
- How can understanding number properties help us solve problems?

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

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Students begin by developing a secure understanding of place value, recognising how the position of a digit determines its value within both integers and decimals. They learn to write integers in words and figures, position integers and decimals accurately on a number line, compare and order numbers, and use powers of ten to understand the structure of the number system. Students also apply place value knowledge in real-life contexts through financial mathematics, before developing confidence in rounding to decimal places and significant figures, estimating accurately and selecting appropriate strategies to check the reasonableness of their answers.

Alongside this, students investigate the properties of numbers by exploring factors, multiples, prime numbers, square numbers and cube numbers. They develop their understanding of exponents, roots and prime factorisation before applying this knowledge to calculate the highest common factor (HCF) and lowest common multiple (LCM). Throughout the topic, students use number properties to solve increasingly complex problems, identify mathematical patterns and explain the relationships between different types of numbers.

Students develop substantive knowledge by understanding the value of digits according to their position, the structure of the number system, the representation, comparison, ordering and rounding of numbers, and the way place value underpins calculation and the use of powers of ten. They also build knowledge of factors, multiples, prime numbers, square numbers, cube numbers and the relationships that exist between different number types.

Alongside this, students strengthen their disciplinary knowledge by reasoning about the size and value of numbers, explaining why digits have particular values, selecting appropriate mathematical representations and applying place value knowledge to solve problems involving estimation, rounding and calculation. They also classify numbers according to their properties, identify patterns, make mathematical generalisations and justify solutions using appropriate mathematical vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including digit, number, value, place value, ones, tens, hundreds, thousands, decimal, decimal place, integer, whole number, positive, negative, compare, order, greater than, less than, round, estimate, approximate, power of ten, factor, multiple, divisor, prime number, composite number, square number, cube number, square root, cube root, product, common factor, highest common factor (HCF), common multiple, lowest common multiple (LCM), sequence, pattern, relationship, property, classify, divisible and remainder.

Pre-Requisite Knowledge *What have we already learned that will help us with this topic?*	**Pitch Up** *How will we challenge ourselves?*
Students will have developed an understanding of the basic number system, including recognising digits, counting, comparing numbers and using the four operations. They will have experience with multiplication and division facts, times tables, and identifying simple patterns and sequences. Students will also have encountered factors, multiples, square numbers and basic properties of numbers at primary level. This topic builds on students' existing understanding of numbers by developing greater fluency and deeper reasoning. Place value knowledge is extended to larger numbers, decimals and more complex calculations, while	Students will be challenged through reasoning and problem-solving activities that require them to explain their thinking, identify patterns and apply knowledge in unfamiliar contexts. They will explore deeper connections between number properties, justify solutions and use mathematical vocabulary accurately rather than relying only on procedures.

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number properties are explored in greater depth to help students recognise patterns and make connections.

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

Place value and number properties provide the foundation for all future mathematics. Secure understanding of numbers supports later learning in algebra, fractions, percentages, ratio, probability and statistics.

Understanding factors, multiples, squares and cubes helps students recognise patterns, simplify problems and develop mathematical reasoning. These skills are essential for more advanced topics such as simplifying algebraic expressions, working with powers and roots, solving equations and understanding mathematical relationships.

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

Students will deepen their understanding by exploring how number systems are used in real-life contexts, including finance, measurement, computing and scientific calculations. Connections to topics such as prime numbers, coding, patterns in nature and mathematical problem-solving show how number properties are used beyond the classroom.

Developing confidence with numbers allows students to become more effective problem-solvers and prepares them for increasingly complex mathematical thinking.

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

Place value and number properties are essential skills used in everyday life. Understanding numbers helps people make informed decisions when working with money, measurements, time, data and comparisons. SMSC is developed through perseverance, resilience and recognising that there are often different methods for solving mathematical problems. Students learn to justify their reasoning and respect alternative approaches to reaching the same solution.

Cross-curricular links include Science, where accurate measurement and calculation are fundamental, Geography, through scale and numerical data, and Computing, where number systems underpin programming and algorithms.
Students explore careers including; Accountant – using numerical accuracy to manage financial information, Civil Engineer – applying measurement and calculation to design safe structures and Data Analyst – interpreting numerical information to identify patterns and support decision making.

The topic supports the Skills Builder Universal Framework, particularly:

- Problem Solving – selecting efficient methods and applying place value and number properties to increasingly complex problems.
- Planning – choosing appropriate strategies to estimate, round, calculate and check the reasonableness of answers.
- Speaking – explaining mathematical reasoning clearly, justifying methods and using precise mathematical vocabulary.

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

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

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○ Corbett Maths ○ SPARXmaths.com ○ BBC Bitesize	Assessment includes questioning, class discussions, independent practice, problem-solving activities and recall of key vocabulary, facts and methods relating to place value, factors, multiples, square numbers and cube numbers. The assessment has been designed to assess both procedural fluency (50%) and mathematical reasoning and problem solving (50%). Students demonstrate secure understanding of place value and number properties whilst applying their knowledge to explain methods, identify patterns and solve increasingly complex mathematical problems.

Term 2 Topic	**3. Arithmetic procedures with integers and decimals** **4. Expressions and Equations**

Big Picture

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

Students develop fluency and confidence with arithmetic procedures involving integers and decimals. They apply the four operations accurately, use mental and written calculation methods, and develop efficient strategies for solving problems. They also learn how to check whether answers are reasonable through estimation, rounding and inverse operations. Alongside this, students are introduced to algebraic thinking through expressions and equations. They begin to understand how letters can represent unknown values, how mathematical relationships can be written using algebraic notation, and how equations can be solved through logical steps. This topic helps students see the connection between arithmetic and algebra, building the confidence needed to calculate accurately, represent relationships and solve unknown values.

- How can we calculate accurately and efficiently with integers and decimals?
- Why are different methods useful for solving calculations?
- How can we check whether an answer is reasonable?
- How can numbers and relationships be represented using algebra?
- What do expressions and equations tell us?
- How can we use algebra to find unknown values and solve problems?

Zoom In

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

Students begin by developing their arithmetic procedures. They practise mental addition and subtraction strategies before strengthening written addition and subtraction methods. They then build confidence with multiplication strategies, including short and long multiplication, before moving on to division strategies, short division and decimal calculations. Students also apply BIDMAS and arithmetic laws to understand how calculations are structured, before extending their fluency to directed number through addition, subtraction, multiplication and division.

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Through this work, students develop fluency with calculations, learn to choose efficient methods, reason about their mathematical thinking and apply arithmetic skills to unfamiliar problems. They develop substantive knowledge by understanding the rules and properties of integers, including positive and negative numbers, using the four operations accurately with whole numbers and decimals, applying place value when working with decimals, recognising the relationship between operations and inverse operations, and understanding the order of operations. Their disciplinary knowledge is developed through selecting appropriate methods, solving multi-step problems, checking answers using estimation and inverse operations, explaining reasoning, identifying errors and applying numerical skills in unfamiliar and real-world contexts.

Students then move into expressions and equations. They are introduced to algebraic notation, writing expressions, simplifying expressions, expanding single brackets and substitution. They then form equations, solve one-step and two-step equations, and apply algebraic reasoning to problem-solving. This helps students translate between words and mathematical expressions, recognise patterns and relationships, solve problems using algebraic reasoning, and explain and justify their solutions.

Within this section, students develop substantive knowledge by understanding that letters can represent unknown values or variables, knowing the difference between expressions and equations, understanding algebraic notation including terms and coefficients, simplifying expressions, substituting values, and recognising equality as a way of representing relationships. Their disciplinary knowledge is strengthened by translating mathematical situations into expressions and equations, manipulating algebraic expressions using mathematical rules, solving equations using logical steps and inverse operations, reasoning about patterns and relationships, and communicating mathematical thinking clearly using correct algebraic language.

Key vocabulary is introduced and revisited throughout the topic, including integer, positive, negative, decimal, place value, operation, addition, subtraction, multiplication, division, inverse, estimate, calculate, rounding, order of operations, algebra, variable, unknown, term, coefficient, expression, equation, simplify, substitute, evaluate, solution, inverse operation, equality and formula.

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

Students will build on their understanding of place value, the four operations and number properties. They will use their knowledge of positive and negative numbers, decimals, multiplication and division facts, and calculation strategies to develop greater fluency and accuracy.
Students' previous experience with patterns, sequences and using symbols will support the transition into algebraic thinking, where numbers and relationships are represented using expressions and equations.

Pitch Up
How will we challenge ourselves?

Students will be challenged through reasoning and problem-solving activities that require them to apply methods rather than simply follow procedures. They will explain their thinking, compare different approaches, identify errors and justify solutions.
Students will work with increasingly complex calculations, multi-step problems and unfamiliar contexts, developing confidence in selecting efficient strategies and making connections between arithmetic and algebra.

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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Arithmetic fluency provides the foundation for all areas of mathematics. Secure calculation skills support future learning in fractions, percentages, ratio, probability, statistics and more advanced algebra. Understanding expressions and equations prepares students for solving more complex problems involving algebra, graphs, functions and mathematical modelling. It develops the ability to represent relationships, reason logically and solve unknowns, which are key skills for further study and many careers.	Students deepen their understanding by exploring how calculations and algebra are used to represent real-life situations, including budgeting, scientific formulas, patterns, technology and problem-solving. Connections to science, computing, engineering and economics help students understand how mathematics is used to describe relationships, make predictions and create solutions. This supports accuracy, logical thinking and confidence in applying mathematics beyond the classroom.

Authentic connections

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

Arithmetic procedures are used every day when working with money, measurements, time, data and decision-making. Being able to calculate accurately helps people solve practical problems and make informed choices. Expressions and equations are used to represent relationships and solve problems in careers linked to engineering, science, finance, technology, construction and computing.

This topic links to science through formulas and calculations, Computing through algorithms and patterns, Geography through data analysis and scale, and Design Technology through measurement and accuracy. Students develop important values including resilience, precision, logical thinking and perseverance by learning to solve problems, check their work and explain their mathematical reasoning.

The topic supports the Skills Builder Universal Framework; particularly:

- Listening through evaluating mathematical explanations, responding to feedback and considering different approaches to solving problems.
- Problem Solving through applying arithmetic procedures and algebraic techniques to unfamiliar contexts.
- Teamwork through discussing strategies, comparing methods and working collaboratively to solve mathematical 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 tasks and recall of key vocabulary, facts and methods. Students' complete calculations accurately, apply number skills to solve problems, explain their reasoning using appropriate mathematical language, identify patterns, make connections and justify their answers.
The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of arithmetic procedures, expressions and

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	equations, whilst applying mathematical reasoning, correcting misconceptions and using their knowledge in unfamiliar and real-life contexts.

Term 3 Topic		**5. Plotting coordinates** **6. Perimeter and Area**

Big Picture

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

Students develop an understanding of how mathematical ideas can be represented visually through coordinates and geometry. They learn how to locate and describe positions accurately on a coordinate grid, recognising how coordinates can be used to represent shapes, lines and mathematical relationships.

Alongside this, students develop their understanding of perimeter and area by calculating the distance around shapes and the space enclosed within them. They apply appropriate methods and formulae to a range of two-dimensional shapes, using measurement accurately and selecting efficient strategies to solve increasingly complex problems. Together, these concepts strengthen students' spatial reasoning and provide important foundations for future learning in geometry, graphs and mathematical modelling.

- How can we describe the position of a point accurately?
- How do coordinates help us represent and understand shapes and patterns?
- What information do we need to calculate perimeter and area?
- Why are different formulae needed for different shapes?
- How can we use measurements to solve real-world problems?
- How can we check whether an answer is reasonable?

Zoom In

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

Students begin by developing their understanding of coordinates, learning to plot and read positions accurately in both the first quadrant and all four quadrants. They investigate how points can be used to create shapes before drawing and interpreting the lines y=k, x=k, y=mx and y=x+a. As their confidence grows, students calculate and interpret gradients, read and analyse graphs, and apply coordinate skills within a range of real-life contexts.

Students develop substantive knowledge by understanding how the coordinate grid is structured using the x-axis and y-axis, how coordinates are written and interpreted, the significance of the four quadrants, and how coordinates can be used to represent shapes, movements and mathematical relationships. Alongside this, they strengthen their disciplinary knowledge by plotting and reading coordinates accurately, describing positions using precise mathematical language, identifying patterns and relationships, and using coordinates to solve problems and represent shapes on a grid.

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Building upon these graphical skills, students investigate perimeter and area. They calculate the perimeter of rectangles and compound shapes before finding the area of rectangles, parallelograms, triangles and compound shapes. Students also develop their understanding of units of measure and apply their knowledge to scale drawings and mixed geometry problems, selecting appropriate methods and formulae to solve increasingly challenging measurement tasks.

Through this work, students develop substantive knowledge by understanding the difference between perimeter and area, knowing the methods and formulae required to calculate the perimeter and area of common two-dimensional shapes, recognising the importance of accurate units of measurement, and understanding how the properties of shapes influence their measurements. Their disciplinary knowledge is strengthened through selecting appropriate methods and formulae, applying shape properties to calculate missing measurements, reasoning mathematically, explaining solutions using appropriate vocabulary and applying perimeter and area in practical contexts involving design, planning and measurement.

Key vocabulary is introduced and revisited throughout the topic, including plot, coordinate, grid, axis, x-axis, y-axis, origin, quadrant, point, position, horizontal, vertical, perimeter, area, length, width, side, dimension, measure, unit, square units, formula, rectangle, triangle, parallelogram, compound shape, estimate and calculate.

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

Students will build on their understanding of number, measurement and shape properties. They will use previous knowledge of positive and negative numbers, grids, measuring lengths, units of measurement and properties of 2D shapes.
Students' understanding of multiplication, addition and formulae will support calculating perimeter and area accurately. Previous work with patterns and sequences will help students recognise relationships when working with coordinates.

Pitch Up
How will we challenge ourselves?

Students will be challenged through problem-solving activities that require them to apply their knowledge in unfamiliar contexts. They will explain their reasoning, justify methods and compare different approaches.
Students will explore more complex coordinate problems, including shapes on grids, missing measurements and compound shapes. They will develop deeper understanding by linking coordinate geometry with measurement, patterns and real-world applications.

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

Coordinate knowledge provides the foundation for future learning in graphs, transformations, equations and algebra. Understanding position and relationships between points supports more advanced work in coordinate geometry and mathematical modelling.
Perimeter and area develop essential measurement skills needed for future topics such as surface area, volume, trigonometry and more complex geometry. These concepts help students solve problems involving space, size and design.

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

Students will deepen their understanding by exploring how coordinates and measurement are used in real-world contexts, including maps, architecture, engineering, design, construction and technology.
Links to subjects such as geography (maps and scale), science (measurement), computing (graphics and coordinates) and design technology (planning and accuracy) show how mathematics is used to describe, create and solve problems in the wider world.

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Authentic connections

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

Coordinates, perimeter and area are used in a wide range of real-life situations, including reading maps, planning spaces, measuring materials, designing buildings and creating digital graphics. Developing confidence with these concepts enables students to solve practical problems accurately and appreciate the importance of mathematics beyond the classroom. SMSC is developed through resilience, logical thinking and perseverance as students apply mathematical methods to increasingly complex problems and recognise that there are often different strategies for reaching the same solution.

Cross-curricular links include Geography through grid references, mapping and scale, Design Technology through measurement and design, Science through practical measurement and data collection, and Computing through coordinates, graphics and computer modelling.

Students explore careers including:

- Architect – using coordinates, scale and measurement to design buildings and spaces.
- Surveyor – measuring land, buildings and infrastructure accurately.
- Graphic Designer – applying coordinate systems and geometric principles within digital design.

The topic supports the Skills Builder Universal Framework, particularly:

- Planning through selecting appropriate methods and formulae when solving geometrical and measurement problems.
- Creativity through visualising shapes, interpreting coordinates and representing mathematical ideas in different ways.
- Problem Solving through applying coordinate and measurement skills to unfamiliar situations and justifying mathematical solutions.

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 formulae relating to coordinates, perimeter and area. Students demonstrate their understanding by plotting and interpreting coordinates accurately, calculating perimeter and area using appropriate methods, and applying these skills in increasingly challenging contexts.
The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of coordinates, perimeter and area whilst applying mathematical reasoning, selecting efficient strategies, interpreting mathematical representations and communicating their thinking using precise mathematical vocabulary.

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Term 4 Topic	**7. Arithmetic procedures including fractions**

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

Students develop fluency and confidence when working with fractions, decimals and percentages, recognising the relationships between these different forms of representing number. They learn how to compare, simplify and calculate with fractions, whilst understanding how equivalent representations can be used to solve problems efficiently.
Throughout the topic, students strengthen their understanding of proportional reasoning by making connections between fractions, decimals and percentages. They develop confidence in selecting appropriate methods, communicating mathematical reasoning and applying these concepts to increasingly complex calculations and real-life contexts.

- What do fractions represent and how do they relate to whole numbers?
- How can we compare and order fractions?
- Why do we need different methods when adding, subtracting, multiplying and dividing fractions?
- How can we check whether a fraction calculation is reasonable?
- How are fractions connected to decimals, percentages and real-life situations?
- How can we use fractions to solve problems effectively?

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

Students begin by developing their understanding of equivalent fractions, learning how to simplify fractions and recognise the relationships between fractions, decimals and percentages. They compare and order fractions and decimals before applying this knowledge to calculations involving fractions, selecting efficient methods and explaining their reasoning.

As their confidence grows, students investigate the connections between fractions, decimals and percentages, converting fluently between each form and recognising when different representations are most appropriate. Throughout the topic, students apply their understanding to increasingly challenging problems, identifying patterns, justifying methods and selecting efficient strategies for solving mathematical questions.

Students develop substantive knowledge by understanding the meaning of fractions as parts of a whole, recognising equivalent fractions, understanding the relationships between fractions, decimals and percentages, and applying appropriate calculation methods accurately. They also develop a secure understanding of ordering, comparing and converting between different numerical representations.

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Alongside this, students strengthen their disciplinary knowledge by selecting efficient calculation methods, applying proportional reasoning, explaining mathematical thinking, recognising patterns and relationships, solving multi-step problems and communicating their reasoning using accurate mathematical vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including fraction, numerator, denominator, equivalent, simplify, common denominator, decimal, percentage, convert, compare, order, improper fraction, mixed number, calculation, proportion, representation, estimate 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, the four operations and multiplication/division facts. They will use previous knowledge of factors, multiples, highest common factors (HCF) and lowest common multiples (LCM) to simplify fractions and find common denominators.

Students' understanding of equivalence, ratio and decimals will support making connections between fractions, decimals and percentages.

Pitch Up
How will we challenge ourselves?

Students will be challenged through reasoning and problem-solving tasks that require them to explain methods, justify answers and apply fraction knowledge in unfamiliar contexts.

They will explore more complex calculations, multi-step problems and real-life applications involving fractions. Students will be encouraged to compare different methods, identify errors and make connections between fractions and other areas of mathematics.

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

Fractions are a fundamental part of mathematics and provide the foundation for future learning in decimals, percentages, ratio, proportion, probability and algebra. Secure understanding of fraction operations supports students in solving more complex problems and applying mathematics confidently.

Fraction knowledge is essential for understanding relationships between quantities, simplifying expressions, working with equations and interpreting data. It develops students' ability to reason, make connections and solve problems efficiently.

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

Students will deepen their understanding by exploring how fractions are used in real-life contexts such as finance, measurement, recipes, science and probability. Connections to subjects such as science (measurements and calculations), geography (scale and data), computing (algorithms) and economics (percentages and proportions) help students see how fractions are used to represent and compare quantities in the wider world.

Students develop important mathematical values including accuracy, resilience and logical thinking through solving complex problems and explaining their reasoning.

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

Fractions, decimals and percentages are used every day when interpreting discounts, interest rates, recipes, measurements, probabilities and data. Understanding the relationships between these representations enables students to make informed decisions and solve practical problems accurately. SMSC is developed

through resilience, logical reasoning and perseverance as students refine methods, recognise patterns and appreciate that mathematical problems can often be solved in different ways.

Cross-curricular links include Science through calculations and experimental data, Geography through population statistics and percentages, Business through finance and profit, and Food Technology through ratio and measurement.

Students explore careers including:

- Pharmacist – calculating accurate dosages using fractions, decimals and percentages.
- Financial Adviser – applying percentages and proportional reasoning to budgeting, savings and investments.
- Laboratory Technician – using precise measurements and calculations during scientific investigations.

The topic supports the Skills Builder Universal Framework, particularly:

- Listening through evaluating mathematical explanations and responding to feedback.
- Creativity through recognising connections between different numerical representations and selecting efficient strategies.
- Problem Solving through applying fractions, decimals and percentages to increasingly complex mathematical and real-world situations.

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 fractions, decimals and percentages. Students demonstrate their understanding by comparing, simplifying, converting and calculating accurately whilst applying these skills in increasingly challenging contexts. The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of fractions, decimals and percentages whilst applying mathematical reasoning, selecting efficient strategies, communicating their thinking clearly and solving unfamiliar problems using appropriate mathematical methods.

Term 5 Topic	**8. Understanding multiplicative relationships: fractions and ratio** **9. Sets and probability**

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

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Students develop an understanding of multiplicative relationships and how quantities can be compared using fractions and ratio. They explore how parts relate to wholes, how quantities change proportionally and how these ideas can be applied to solve problems.

Students explore sets and probability by understanding how objects, numbers or outcomes can be grouped and represented. They learn how probability describes the likelihood of events and how mathematical reasoning can be used to make predictions.

- How can fractions and ratios describe relationships between quantities?
- What does it mean for two quantities to be proportional?
- How can we compare and represent parts of a whole?
- How can sets help us organise and understand information?
- How can we measure the likelihood of an event happening?
- How can probability help us make predictions and decisions?
- How can mathematical models represent real-life situations?

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

Students begin by developing their understanding of multiplicative relationships through fractions and ratio. They investigate direct proportion, ratio notation, simplifying ratios, the connections between fractions and ratio, sharing in a ratio, scaling recipes, conversion graphs, converting between currencies, similar shapes, scale diagrams, maps and scale factors, direct proportion from tables, inverse proportion, inverse proportion from tables and ratio problems. Throughout the topic, students compare quantities, identify multiplicative relationships, scale quantities up and down, solve proportional problems and explain the reasoning behind their methods.

Students develop substantive knowledge by understanding fractions as relationships between parts and wholes, recognising how fractions, decimals and percentages are connected, understanding ratio as a comparison between quantities, knowing how ratios can be simplified and represented in different forms, and recognising how proportional relationships describe quantities that change together. Alongside this, students strengthen their disciplinary knowledge by comparing quantities using fractions and ratios, applying multiplicative reasoning to solve problems, scaling quantities and identifying proportional relationships, explaining methods and justifying solutions, and applying fraction and ratio knowledge to real-life situations.

Students then move on to sets and probability, learning how to identify and represent sets, use Venn diagrams, understand intersections and unions of sets, apply the vocabulary of probability, construct sample spaces for single events, and calculate the probability of single events using the probability scale. Through this work, students organise and interpret information, represent mathematical ideas using diagrams and notation, reason about uncertainty and apply probability to solve problems and make predictions.

Students develop substantive knowledge by understanding what sets represent, how objects and numbers can be grouped, the meaning of set notation and overlapping sets, probability as a measure of likelihood, how outcomes, events and sample spaces are represented, and that probabilities range from impossible to certain. Their disciplinary knowledge is developed through organising and classifying information using sets and diagrams, interpreting relationships between sets,

calculating and comparing probabilities, using probability to make predictions and evaluate outcomes, and communicating mathematical reasoning using accurate mathematical language.

Key vocabulary is introduced and revisited throughout the topic, including fraction, numerator, denominator, equivalent, proportion, ratio, simplify, compare, scale, multiplier, quantity, part, whole, percentage, decimal, relationship, set, element, member, subset, union, intersection, Venn diagram, outcome, event, sample space, probability, likelihood, impossible, unlikely, equally likely, certain, random and chance.

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

Students will build on their understanding of fractions, decimals and percentages, including comparing quantities and calculating with fractions. They will use previous knowledge of multiplication, division, factors and multiples to understand scaling and proportional relationships.
Students' experience of organising information, reading diagrams and working with chance will support their understanding of sets, probability and representing outcomes.

Pitch Up
How will we challenge ourselves?

Students will be challenged through reasoning and problem-solving tasks that require them to apply proportional thinking rather than rely on procedures. They will explain relationships, justify decisions and solve multi-step problems in unfamiliar contexts.
Students will explore more complex ratio problems, probability scenarios and set relationships, including interpreting information from diagrams and evaluating whether predictions are reasonable.

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

Understanding fractions and ratio provides the foundation for future learning in percentages, proportion, algebra, similarity, probability and statistics. These ideas help students understand relationships between quantities and solve more complex mathematical problems.
Knowledge of sets and probability supports future work with data handling, statistics, probability models and mathematical reasoning. Students develop the ability to analyse information, make predictions and use evidence to support decisions.

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

Students will deepen their understanding by exploring how ratio and probability are used in real-life contexts such as finance, science, risk, sport, surveys and decision-making.

Links to subjects such as science (probability and data), geography (population data and scale), computing (logic and algorithms) and economics (risk and prediction) show how mathematics is used to interpret information and model real-world situations. Students develop wider skills including critical thinking, reasoning, accuracy and evaluating evidence.

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

Fractions, ratio and probability are used every day when comparing quantities, analysing data, interpreting risk and making informed decisions. Understanding these concepts helps people solve practical problems and interpret the world more accurately. SMSC is developed through logical reasoning, resilience and critical thinking as students evaluate evidence, justify mathematical decisions and recognise that problems can often be solved using different approaches.
Cross-curricular links include Science through experiments and probability, Geography through population comparisons and data interpretation, Computing through logic and algorithms, Physical Education through performance statistics, and Business through financial calculations and risk.

New Line Learning Academy
Believe and Achieve

Students explore careers including:

- Data Analyst – interpreting data, identifying trends and making evidence-based recommendations.
- Actuary – using probability and statistics to assess financial risk.
- Engineer – applying ratio, scale and proportional reasoning when designing and testing solutions.

The topic supports the Skills Builder Universal Framework, particularly:

- Leadership through making informed decisions and justifying mathematical reasoning.
- Listening through evaluating different mathematical approaches and responding to feedback.
- Problem Solving through applying proportional reasoning and probability to unfamiliar situations.

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 fractions, ratio, sets and probability. Students demonstrate their understanding by comparing quantities, solving proportional problems, interpreting sets and calculating probabilities whilst applying these skills in increasingly challenging contexts. The assessment has been designed to assess both substantive mathematical knowledge (50%) and disciplinary mathematical knowledge (50%). Students demonstrate secure understanding of multiplicative relationships, sets and probability whilst applying mathematical reasoning, selecting efficient strategies, communicating their thinking clearly and solving unfamiliar problems using appropriate mathematical methods.

Term 6 Topic	**10. Angles** **11. Transformations**

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

Students develop their understanding of geometry by exploring angles, their properties and the relationships that exist between them. They learn how angles are formed, measured and classified before applying angle rules to solve increasingly complex geometric problems. Alongside this, students investigate the properties of triangles, quadrilaterals and polygons, recognising how these shapes are connected through mathematical reasoning.

Students also explore transformations, developing their understanding of how shapes can be translated, reflected, rotated and enlarged whilst maintaining key geometric properties. Through visualising movement and change, students strengthen their spatial reasoning and appreciate how geometry helps us describe patterns, position and design in the world around us.

Throughout the topic, students consider the following enquiry questions:

- What are angles and how can we measure and describe them?
- What relationships exist between angles in different shapes and diagrams?
- How can we use angle rules to solve problems?
- How can shapes be moved or changed whilst keeping their properties?
- What does a transformation tell us about the relationship between shapes?
- How can geometry help us understand patterns, designs and the world around us?

Zoom In

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

Students begin by developing their understanding of angles. They learn to draw and measure line segments accurately, apply mathematical labelling conventions, classify angles according to their size and understand angles as a measure of turn. They measure and draw angles up to 180°, investigate the properties of triangles, quadrilaterals and polygons up to a decagon, and construct triangles using SAS, ASA and SSS. Students then apply angle rules involving angles at a point, angles on a straight line and vertically opposite angles to solve increasingly challenging geometrical problems.

Students develop substantive knowledge by understanding angles as a measure of rotation measured in degrees, recognising the different types of angles, understanding the angle properties of shapes, and recognising the relationships between parallel lines and angles. Alongside this, they strengthen their disciplinary knowledge by measuring and drawing angles accurately, applying angle rules to solve problems, reasoning about missing angles, explaining solutions using precise mathematical language and justifying answers using geometric properties.

Building on this understanding, students investigate transformations by identifying and describing the results of translations, reflections, rotations and enlargements, before exploring symmetry and the movement of shapes on a coordinate grid. They recognise which properties remain unchanged during transformations and explain how shapes change position, orientation or size.

Through this work, students develop substantive knowledge by understanding transformations as changes to the position, size or orientation of shapes, knowing the four main transformations, understanding how coordinates describe movement, recognising invariant properties and understanding the effect of scale factors during enlargement. Their disciplinary knowledge is strengthened through describing and carrying out transformations accurately, using coordinates to represent movement, identifying patterns and relationships between shapes, applying transformations to solve problems and interpreting diagrams using appropriate mathematical vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including angle, degree, acute, obtuse, right angle, reflex, straight line, vertex, parallel, perpendicular, interior angle, exterior angle, polygon, triangle, quadrilateral, angle rule, transformation, translation, reflection, rotation, enlargement, scale factor, centre of rotation, mirror line, clockwise, anticlockwise, coordinates, image, object, congruent and invariant.

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

Students will build on their understanding of 2D shapes, shape properties, measuring, coordinates and using mathematical vocabulary to describe position and movement.

Students' previous knowledge of number skills, using a protractor, reading grids and recognising patterns will support their understanding of angle rules and transformations. They will use prior learning about lines, shapes and symmetry to explore how figures can be moved and changed.

Pitch Up
How will we challenge ourselves?

Students will be challenged through reasoning tasks that require them to apply geometric rules, explain their thinking and solve unfamiliar problems.

They will explore more complex angle problems, multi-step reasoning questions and transformations involving coordinates. Students will justify solutions, identify errors and make connections between geometry, patterns and real-world designs.

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

Understanding angles and transformations provides the foundation for future learning in geometry, trigonometry, vectors, similarity and coordinate geometry. Students develop the ability to reason about shapes, movement and relationships, which supports more advanced mathematical problem-solving.

Angle knowledge is essential for understanding properties of shapes, measuring, construction and mathematical proofs. Transformations prepare students for studying symmetry, functions, graphs and how mathematical models represent change.

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

Students will deepen their understanding by exploring how angles and transformations are used in real-life contexts such as architecture, engineering, design, art, computer graphics and navigation.
Links to other subjects such as science (forces and movement), computing (animations and graphics), art (symmetry and patterns) and design technology (structures and planning) show how geometry is used to create, analyse and solve problems.
Students develop important values including accuracy, creativity, logical thinking and perseverance through exploring patterns, testing ideas and justifying mathematical reasoning.

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

Angles and transformations are used every day when designing buildings, creating digital graphics, navigating routes and analysing movement. Understanding geometric relationships enables students to interpret the world more accurately and apply mathematical thinking to practical situations. SMSC is developed through resilience, precision and logical reasoning as students justify geometric relationships, evaluate different methods and recognise that mathematical problems can often be approached in different ways.

Cross-curricular links include Science through forces, movement and measurement, Computing through graphics and animation, Art through symmetry, pattern and design, and Design Technology through construction and technical drawing.

New Line Learning Academy
Believe and Achieve

Students explore careers including:

- Architect – using geometry to design safe, functional and creative buildings.
- Graphic Designer – applying transformations, symmetry and spatial reasoning in digital design.
- Surveyor – using accurate measurement, angles and mapping to record and plan land and buildings.

The topic supports the Skills Builder Universal Framework, particularly:

- Creativity through visualising shapes and interpreting geometric transformations.
- Leadership through confidently explaining and justifying mathematical reasoning during collaborative problem-solving.
- Planning through selecting appropriate geometric methods and strategies to solve increasingly complex problems.

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 geometric rules relating to angles and transformations. Students demonstrate their understanding by measuring and drawing accurately, applying angle rules, carrying out transformations 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 angles, shape properties and transformations whilst applying mathematical reasoning, selecting efficient strategies, interpreting geometric relationships and communicating their thinking clearly.