New Line Learning Academy
Believe and Achieve

Mathematics Intent	Year 11

We believe that all of our pupils can be mathematicians, who enjoy and excel in mathematics at all levels. All The Mathematics Department will provide pupils with exciting, relevant, and challenging Mathematics, delivered by dedicated staff. Pupils will understand the underlying principles of the mathematics they learn, making links and developing reasoning skills and logical thinking. They will progress towards being independent mathematicians who can identify and correct misconceptions for themselves. Pupils will develop their confidence to tackle a range of problems.

To achieve this, staff will design and develop simple and effective systems and interesting and effective teaching ideas and resources to enable classroom delivery and promote mathematics across the school.

At New Line Learning Academy, we teach the National Curriculum for mathematics, which aims to ensure that all pupils:
- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and can recall and apply their knowledge rapidly and accurately to problems.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Term 1
Topic

Number, Indices and Advanced Algebra

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

Students develop their understanding of number and algebra by applying numerical and algebraic methods to solve increasingly complex mathematical problems.

Foundation students develop confidence in calculating with fractions, converting between standard form and ordinary numbers, performing calculations using standard form, and applying the laws of indices, including negative and fractional indices.

Higher students extend their algebraic understanding by rearranging formulae where the subject appears more than once, calculating and simplifying algebraic fractions, solving equations involving algebraic fractions, and investigating composite functions, inverse functions and algebraic proofs. These topics prepare students for their mock examinations and provide a foundation for identifying and addressing gaps in learning during the remainder of the course.

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

Foundation students begin by developing their understanding of fractions, applying efficient methods to calculate with fractions before converting between standard form and ordinary numbers. They then perform calculations involving numbers in standard form and consolidate their understanding of the laws of indices, including negative and fractional indices.

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Higher students build upon their previous algebraic knowledge by rearranging formulae where the subject appears more than once, before calculating and simplifying algebraic fractions and solving equations involving algebraic fractions. Students then investigate composite functions, inverse functions and algebraic proofs, developing increasingly sophisticated algebraic techniques and mathematical reasoning.

Students develop substantive knowledge by understanding the relationships between fractions, standard form, indices and algebraic expressions, and recognising how these mathematical ideas can be applied to solve a range of problems. Alongside this, students strengthen their disciplinary knowledge by selecting appropriate mathematical methods, manipulating algebraic expressions accurately, solving increasingly complex equations, reasoning logically and communicating mathematical solutions using accurate mathematical vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including fraction, equivalent fraction, standard form, index, indices, negative index, fractional index, algebraic fraction, formula, rearrange, composite function, inverse function, proof, variable, substitute and reasoning.

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

Foundation students build upon their understanding of the laws of indices, simplifying fractions, equivalent fractions, and adding and subtracting simple fractions.

Higher students build upon their understanding of rearranging simple formulae, calculating with fractions, solving linear equations, solving quadratic equations and substitution.

Pitch Up
How will we challenge ourselves?

Students extend their reasoning by applying fractions, indices and algebra in increasingly challenging contexts.
Foundation students apply fractions and standard form when solving problems involving the area and perimeter of two-dimensional shapes, and substitute fractions and standard form into algebraic expressions.
Higher students combine algebraic fractions with previously studied topics, including area and volume, to solve increasingly complex mathematical problems.

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

Students will complete their mock examinations at the end of this term. The knowledge and skills developed throughout this unit will be assessed and used to identify strengths and areas for improvement, informing future learning and revision.

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

Number and algebra have formed the foundation of mathematics for centuries and continue to underpin developments in science, engineering, finance and technology. Understanding how numerical and algebraic relationships work enables mathematicians and scientists to model real-world situations, solve complex problems and develop new ideas.

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

Number and algebra are used across many aspects of modern life, from solving scientific formulae and analysing financial information to programming computer software and designing engineering solutions. Understanding these mathematical ideas enables students to solve problems, identify relationships and apply mathematical reasoning across a wide range of contexts. SMSC is developed through resilience, logical reasoning and precision as students manipulate algebraic expressions, justify mathematical conclusions and appreciate the importance of accuracy when solving increasingly complex problems.

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Cross-curricular links include Science through rearranging and applying scientific formulae, including calculations involving speed, velocity and other mathematical relationships.

Students explore careers including:

- Engineer – using algebra to solve problems, rearrange formulae and calculate unknown values within engineering systems.
- Software Developer – applying algebraic thinking, variables and functions when designing algorithms and writing computer programs.
- Data Analyst – interpreting numerical information, modelling relationships and applying mathematical formulae to identify patterns and trends.

The topic supports the Skills Builder Universal Framework, particularly:

- Planning through selecting efficient mathematical methods and organising multi-step solutions.
- Speaking through explaining algebraic reasoning and justifying mathematical methods using accurate vocabulary.
- Problem Solving through applying number skills and algebra to increasingly complex 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?
○ Tutorial videos for all topics and interactive questions available at www.sparxmath.com All students are provided with an account and set weekly homework by their teacher as well as being a tool on which to complete independent study as needed to close gaps from assessments ○ Tutorial videos and practice exam questions available at www.mathsgenie.co.uk ○ Tutorial videos, practice questions and practice exam questions available at www.corbettmaths.com ○ BBC Bitesize	Assessment takes place throughout the unit through questioning, class discussion, independent practice, retrieval activities and problem-solving tasks. Students demonstrate their understanding by recalling and applying key mathematical knowledge, selecting appropriate methods, explaining their reasoning and solving increasingly complex mathematical problems. At the end of the unit, students complete an assessment that measures the progress made throughout the teaching sequence. Assessments include a mixture of substantive knowledge and disciplinary knowledge, allowing students to demonstrate both their mathematical understanding and their ability to apply this knowledge to unfamiliar problems. Following assessment, students complete targeted improvement activities to address misconceptions and close identified gaps in learning. Assessment materials are based on GCSE examination-style questions, helping students become familiar with the structure, language and mark schemes used in public examinations.

Term 2 Topic	**Similarity, Vectors and Advanced Graphs**

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

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Students develop their understanding of similarity, vectors, graphs and algebra by applying mathematical methods to solve increasingly complex mathematical problems.
Foundation students investigate congruence and similarity, solving problems involving length, area and volume, before developing their understanding of column vectors, cubic and reciprocal graphs, simultaneous equations, rearranging formulae and basic algebraic proofs.
Higher students build upon these ideas by investigating geometric vectors, direct and inverse proportion, exponential functions, gradients of tangents, estimating the area under non-linear graphs, and transformations of graphs, applying increasingly sophisticated mathematical techniques to solve problems and analyse mathematical relationships.

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

Foundation students begin by developing their understanding of congruence and similarity, finding missing lengths in similar shapes and solving problems involving length, area and volume. Students then investigate column vectors, adding and subtracting vectors, finding multiples of vectors and interpreting diagrams involving column vectors. Students continue by drawing and interpreting cubic and reciprocal graphs, before solving simultaneous equations graphically, writing and solving simultaneous equations, rearranging formulae, and developing an understanding of basic algebraic proofs.

Higher students extend their understanding of vectors by solving problems involving geometric vectors, using vectors to show that lines are parallel and solving problems involving ratios. Students then investigate direct and inverse proportion, exponential functions, calculating the gradient of a tangent at a point, estimating the area under a non-linear graph, and understanding and applying transformations of graphs.

Students develop substantive knowledge by understanding congruence, similarity, vectors, graphical representations, proportion and algebraic relationships, recognising how these mathematical ideas can be applied to solve a range of problems. Alongside this, students strengthen their disciplinary knowledge by selecting appropriate mathematical methods, interpreting graphs and diagrams, applying algebraic and geometric techniques, reasoning mathematically and communicating solutions using accurate mathematical vocabulary.

Key vocabulary is introduced and revisited throughout the topic, including congruent, similar, scale factor, vector, column vector, geometric vector, ratio, direct proportion, inverse proportion, cubic graph, reciprocal graph, exponential function, tangent, simultaneous equation, algebraic proof, rearrange, transformation and reasoning.

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

Foundation students build upon their understanding of translations using vectors, solving equations, substitution, calculating with directed numbers, rearranging one and two-step formulae, and drawing linear and quadratic graphs.
Higher students build upon their understanding of translations using vectors, transformations of shapes, area under a linear graph, collecting like terms, calculating with directed numbers, basic direct and inverse proportion, and the gradient and equation of a linear graph.

Pitch Up
How will we challenge ourselves?

Students extend their reasoning by solving increasingly challenging problems involving similar shapes, vectors, graphs and algebra.
Foundation students investigate problems involving the area and volume of similar shapes, solve worded simultaneous equation problems, and calculate with column vectors involving directed numbers.
Higher students extend their understanding through geometric vector proofs, investigate equations of circular graphs where the centre is not (0,0), and apply this knowledge alongside tangents and transformations of graphs to solve more complex mathematical problems.

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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?
Students will complete their mock examinations during Term 3, where the knowledge and skills developed throughout this unit will be assessed. Outcomes from the mock examinations will be used to identify strengths and areas for further improvement.	Similarity, vectors and graphs are fundamental mathematical ideas that allow relationships, movement and change to be represented accurately. These concepts are used throughout mathematics to solve geometric and algebraic problems and continue to underpin developments in engineering, computing, science and technology.

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

Similarity, vectors and graphs are used across many aspects of modern life, from designing computer software and engineering structures to modelling scientific data and analysing mathematical relationships. Understanding these mathematical ideas enables students to represent movement, interpret graphical information and solve increasingly complex problems using mathematical methods. SMSC is developed through logical reasoning, resilience and precision as students justify mathematical conclusions, interpret graphical information and apply mathematical methods accurately when solving unfamiliar problems.

Cross-curricular links include Science through graphs, formulae and mathematical modelling, Computing through programming and computer graphics, Design Technology through CAD and technical drawing, and Physics through vectors, forces and motion.

Students explore careers including:

- CAD Designer – using vectors, transformations and graphs to produce accurate technical drawings and engineering designs.
- Meteorologist – interpreting graphs and mathematical models to predict weather patterns and climate trends.
- Mechanical Engineer – applying vectors, graphs and algebra to analyse forces, movement and engineering systems.

The topic supports the Skills Builder Universal Framework, particularly:

- Listening through interpreting mathematical information and evaluating different solution methods.
- Leadership through explaining mathematical reasoning and supporting others when solving complex problems.
- Problem Solving through applying similarity, vectors, graphs and algebra to increasingly challenging 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?
○ Tutorial videos for all topics and interactive questions available at www.sparxmath.com All students are provided with an account and set weekly homework by their teacher as well as being a tool on which to complete independent study as needed to close gaps from assessments	Assessment takes place throughout the unit through questioning, class discussion, independent practice, retrieval activities and problem-solving tasks. Students demonstrate their understanding by recalling and applying key mathematical knowledge, selecting appropriate methods, explaining their reasoning and solving increasingly complex mathematical problems.

○ Tutorial videos and practice exam questions available at www.mathsgenie.co.uk ○ Tutorial videos, practice questions and practice exam questions available at www.corbettmaths.com ○ BBC Bitesize	At the end of each unit, students complete an assessment that measures the progress made throughout the teaching sequence. Assessments include a mixture of substantive knowledge and disciplinary knowledge, allowing students to demonstrate both their mathematical understanding and their ability to apply this knowledge to unfamiliar problems. Following each assessment, students complete targeted improvement activities to address misconceptions and close identified gaps in learning. Assessment materials are based on GCSE examination-style questions, helping students become familiar with the structure, language and mark schemes used in public examinations.

Term 3 — Mock Examinations, Gap Analysis and GCSE Revision

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

Students will have covered all of the GCSE Mathematics content and will use gap analysis from their mock examinations to inform teaching and learning for individual classes.

Throughout the term, students revisit key topics identified from their mock examination performance, strengthening mathematical fluency, developing problem-solving skills and regularly retrieving prior knowledge. Students continue to prepare for their GCSE examinations through focused revision, examination practice and targeted improvement.

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

During Term 3, students work on key topics identified as gaps in their knowledge following their mock examinations, completed at the end of Term 1 and the beginning of Term 2. Students complete self-assessment sheets for each of the three examination papers, identifying individual target topics that form the basis of both classroom learning and independent revision.

The first part of the term focuses on preparing for the final set of mock examinations. Students continue to revisit target topics, complete general revision activities, strengthen mathematical fluency and further develop their problem-solving skills through a range of GCSE examination-style questions.

Students then complete a full set of three mock examination papers under examination conditions. Following the mock examinations, students review each paper, correct errors, complete further self-assessment and identify priorities for future revision in preparation for their final GCSE examinations.

Students strengthen their substantive knowledge by revisiting mathematical knowledge from across the GCSE course, whilst developing their disciplinary knowledge through selecting efficient methods, applying mathematical reasoning, solving unfamiliar problems and evaluating examination responses.

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Key vocabulary from across the GCSE Mathematics specification is revisited throughout the term, with students consolidating mathematical language, methods and examination techniques across all topic areas.

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

By this stage of the course, students will have completed the full GCSE Mathematics specification and will continue to revisit and retrieve knowledge, skills and methods from across the previous two years of study.

Pitch Up
How will we challenge ourselves?

Students extend their mathematical reasoning by working on increasingly challenging examination questions across all areas of the GCSE specification. They apply feedback from mock examinations to improve weaker topics, justify their methods, compare alternative approaches and develop confidence when tackling unfamiliar examination-style problems under timed conditions.

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

Targeting gaps identified through the mock examinations supports continued progress towards the final GCSE examinations. Students use feedback, self-assessment and focused revision to strengthen weaker areas and improve confidence, accuracy and examination technique before the summer examination series.

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

Revision, retrieval practice and self-assessment are important parts of learning mathematics. Revisiting knowledge over time helps strengthen long-term memory, improve fluency and develop confidence when applying mathematical methods to unfamiliar problems. Learning from mistakes is an important part of mathematical development and supports continued improvement.

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

Revision, retrieval practice and self-evaluation are valuable skills that extend beyond mathematics and support success in further education, training and employment. Learning to identify strengths, respond to feedback and improve performance helps students become more reflective, resilient and independent learners. SMSC is developed through resilience, responsibility and self-reflection as students evaluate their own progress, respond positively to feedback and recognise the importance of perseverance when preparing for challenging examinations.
Cross-curricular links include all curriculum areas where students apply examination techniques, retrieval practice and problem-solving strategies, particularly Science, Business Studies, Geography and Design Technology.

Students explore careers including:

- Teacher – using assessment information to identify strengths, address misconceptions and support progress.
- Quality Assurance Manager – analysing performance, identifying areas for improvement and maintaining high standards.
- Learning and Development Specialist – using assessment and feedback to plan targeted improvement and monitor progress.

The topic supports the Skills Builder Universal Framework, particularly:

- Staying Positive through responding constructively to feedback and learning from mistakes.
- Aiming High through setting personal targets and working towards continual improvement.
- Problem Solving through applying mathematical knowledge across the full GCSE specification in increasingly challenging examination contexts.

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Resources What books, websites, videos and materials will support our learning?	Assessment How will we show what we know, remember and can apply?
○ Tutorial videos for all topics and interactive questions available at www.sparxmath.com All students are provided with an account and set weekly homework by their teacher as well as being a tool on which to complete independent study as needed to close gaps from assessments ○ Tutorial videos and practice exam questions available at www.mathsgenie.co.uk ○ Tutorial videos, practice questions and practice exam questions available at www.corbettmaths.com ○ BBC Bitesize	Assessment takes place throughout the unit through questioning, class discussion, independent practice, retrieval activities and examination-style problem-solving tasks. Students demonstrate their understanding by recalling and applying mathematical knowledge from across the GCSE course, selecting appropriate methods, explaining their reasoning and solving increasingly complex mathematical problems. During the term, students complete a full set of mock GCSE examination papers. Following these assessments, students use self-assessment, teacher feedback and targeted improvement activities to address misconceptions and strengthen areas for development. Assessment materials are based on GCSE examination-style questions, providing further preparation for the final public examinations while supporting continued progress across the course.

Term 4 and 5

GCSE Revision and Examination Preparation

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

Students will have covered all of the GCSE Mathematics content and will continue to use gap analysis from their mock examinations to inform teaching and learning throughout the remainder of the course.

Students spend Terms 4 and 5 revisiting key topics identified from their mock examination performance, strengthening mathematical fluency, developing problem-solving skills and regularly retrieving prior knowledge. As students prepare for their GCSE examinations, teaching focuses on consolidating understanding, refining examination technique and building confidence across the full GCSE specification.

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

Students spend Term 4 working primarily on the topics identified as gaps in their knowledge following their final set of mock examinations, completed during Term 3. Alongside this, students complete a range of revision activities selected by their class teacher, providing frequent opportunities for retrieval practice and the continued development of mathematical problem-solving skills.

As students prepare for their first GCSE examination, additional emphasis is placed on non-calculator methods, reflecting the requirements of the first examination paper. Following Paper 1, revision focuses on the effective use of calculators in preparation for the remaining examination papers.

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Students continue to strengthen their substantive knowledge by revisiting mathematical knowledge from across the GCSE course, whilst developing their disciplinary knowledge through selecting efficient methods, applying mathematical reasoning, solving unfamiliar examination-style problems and evaluating their own performance.

Key vocabulary from across the GCSE Mathematics specification is revisited throughout the term, enabling students to consolidate mathematical language, methods and examination techniques across all topic areas.

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

By this stage of the course, students will have completed the full GCSE Mathematics specification and will continue to revisit and retrieve knowledge, skills and methods from across the previous two years of study.

Pitch Up
How will we challenge ourselves?

Students extend their mathematical reasoning by tackling increasingly demanding GCSE examination questions drawn from across the full specification. They apply feedback from mock examinations to strengthen weaker topics, refine examination techniques and develop confidence when solving unfamiliar mathematical problems under timed conditions. Students are encouraged to explain their reasoning, compare alternative methods and apply mathematical knowledge accurately and efficiently across all areas of the GCSE course.

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

All work completed during this period is intended to prepare students for their final GCSE examinations by consolidating mathematical understanding, strengthening examination technique and addressing gaps in knowledge identified through mock examinations and ongoing assessment.

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

Revision, retrieval practice and regular examination practice are important aspects of learning mathematics. Revisiting knowledge over time strengthens long-term understanding, develops mathematical fluency and increases confidence when applying mathematical methods in unfamiliar contexts. Reflecting on mistakes and responding to feedback supports continual improvement and helps students prepare effectively for public examinations.

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

Throughout the final stages of the GCSE course, students revisit mathematical concepts used across many aspects of modern life, including number, algebra, geometry, graphs, probability and statistics. Consolidating these skills enables students to interpret information, solve increasingly complex problems and apply mathematics confidently across a wide range of real-world contexts. SMSC is developed through resilience, logical reasoning and self-reflection as students evaluate their own understanding, respond to feedback and appreciate the importance of accuracy and perseverance when solving mathematical problems.

Cross-curricular links continue throughout the revision programme, including Science through formulae, graphs and measurement, Geography through data interpretation, scale and mapping, Business Studies through financial calculations and statistical information, and Design Technology through geometry, measurement and technical drawing.

Students explore careers including:

- Investment Analyst – using algebra, percentages, graphs and statistical information to evaluate financial performance and support investment decisions.
- Forensic Scientist – applying measurement, probability, graphs and mathematical reasoning to analyse evidence and investigate crime scenes.

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- Logistics Manager – using ratio, graphs, geometry and data to plan routes, manage resources and improve efficiency.

The topic supports the Skills Builder Universal Framework, particularly:

- Listening through interpreting feedback and mathematical reasoning to identify areas for improvement.
- Speaking through explaining mathematical methods and justifying solutions using precise mathematical vocabulary.
- Problem Solving through applying mathematical knowledge and reasoning across the full GCSE specification in unfamiliar examination contexts.

Resources What books, websites, videos and materials will support our learning?	**Assessment** How will we show what we know, remember and can apply?
○ Tutorial videos for all topics and interactive questions available at www.sparxmath.com All students are provided with an account and set weekly homework by their teacher as well as being a tool on which to complete independent study as needed to close gaps from assessments ○ Tutorial videos and practice exam questions available at www.mathsgenie.co.uk ○ Tutorial videos, practice questions and practice exam questions available at www.corbettmaths.com ○ BBC Bitesize	Assessment takes place throughout the unit through questioning, class discussion, retrieval activities, independent practice and GCSE examination-style problem-solving tasks. Students demonstrate their understanding by recalling and applying mathematical knowledge from across the GCSE specification, selecting appropriate methods, explaining their reasoning and solving increasingly complex problems. Throughout Terms 4 and 5, assessment is closely linked to revision and examination preparation. Students use teacher feedback, self-assessment and targeted improvement activities to address misconceptions, strengthen areas for development and build confidence ahead of the three GCSE examination papers. Assessment materials continue to be based on GCSE examination-style questions, supporting students in applying their knowledge effectively under examination conditions.