Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 1	Number
Intention	To develop fluency in number properties, estimation, and calculations with powers, indices, and surds, including standard form, factors, and multiples.
Key words	prime factorisation, highest common factor, lowest common multiple, indices, standard form, surds, and estimation
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can identify and use place value to estimate and round numbers			
I can find the HCF and LCM using prime factor decomposition and Venn diagrams			
I can calculate with positive, negative, and zero indices			
I can apply rules of indices, including fractional indices, to simplify expressions			
I can express large and small numbers in standard form, and vice-versa			
I can simplify surds and expand single and double brackets			
I can rationalise the denominator, including multiplying by the conjugate			

Unit sequence

1. Number problems and reasoning
2. Place value and estimating
3. HCF and LCM
4. Calculating with powers (indices)
5. Zero, negative and fractional indices
6. Powers of 10 and standard form
7. Surds

Top career

Quantitative Data Analyst

Apply prime number theory and factor analysis to optimise algorithms for data modelling and computational tasks

Salary

£40,000 - £65,000+ per year

Useful links

https://www.sparxmaths.uk/
https://sites.google.com/langdonpark.org/maths
https://www.1stclassmaths.com/edexcelrevision
https://www.mathsgenie.co.uk/
https://corbettmaths.com/
https://mmerevise.co.uk/gcse-maths-revision/
https://www.thenational.academy/pupils/years/
https://www.maths4everyone.com/

YouTube channels

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@mathsmadeeasy123
@TheGCSEMathsTutor
@Cognitoedu
@DrFrostMaths

Be Inclusive

Cathy O'Neil (born 1972) is a renowned mathematician and data scientist, celebrated for critiquing the ethical impacts of big data and algorithmic decision-making in society, advocating responsible technology use and transparency.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 2	**Algebra**
Intention	To develop skills in manipulating algebraic expressions, solving equations, and exploring linear and non-linear sequences.
Key words	term, expression, equation, identity, root, index, exponent, sequence, factorise
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can simplify expressions using algebraic indices			
I can expand single and double brackets in algebraic expressions			
I can factorise algebraic expressions by identifying common factors			
I can solve multi-step linear equations with fractions and variables on both sides			
I can rearrange formulae with fractions and powers to make a variable the subject			
I can generate terms in a linear sequence and find the algebraic Nth term			
I can recognise and explore patterns in non-linear sequences			

Unit sequence

1. Algebraic indices
2. Expanding and factorising
3. Equations
4. Formulae
5. Linear sequences
6. Non-linear sequences
7. More expanding and factorising

Top career

Actuary

Applies algebra and statistics to assess financial risk and forecast outcomes for insurance and finance industries

Salary

£55,000 - £80,000+ per year

Useful links

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Be Inclusive

Mary Hardy (born 1958) is a renowned actuary and professor at the University of Waterloo. She is celebrated for her expertise in financial mathematics, particularly in risk management, insurance, and pensions, influencing actuarial science globally.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 3	**Interpreting and representing data**
Intention	Develop skills in interpreting and constructing statistical diagrams, analysing time series, calculating averages, and identifying trends using scatter graphs.
Key words	survey, primary, secondary, qualitative, quantitative, line of best fit, interpolation
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can draw and interpret bar charts, pie charts, stem and leaf, and frequency polygons			
I can analyse time series data and identify trends over time			
I can plot and interpret scatter graphs to explore relationships between two variables			
I can draw and use a line of best fit on scatter graphs to make predictions			
I can calculate averages, including mean, median, and mode, to summarise data			
I can calculate averages and range of a data set and in grouped frequency table			
I can choose appropriate statistical diagrams to represent different types of data			

Unit sequence

1. Statistical diagrams 1
2. Time series
3. Scatter graphs
4. Line of best fit
5. Averages and range
6. Statistical diagrams 2

Top career

Statistical graphic designer

Specialises in transforming complex data into visually engaging graphics that clearly communicate statistical findings.

Salary

£30,000 - £50,000+ per year

Useful links

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Be Inclusive

Florence Nightingale (1820–1910), a pioneering nurse and statistician, revolutionised healthcare by using statistical data to advocate for sanitary reforms, introducing evidence-based practices and transforming modern nursing and public health policy.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 4	Fractions, ratio and percentages
Intention	To develop proficiency in fractions, ratios, and percentages, understanding their relationships, and apple percentages in different real-life contexts.
Key words	denominator, numerator, ratio, multiplier, reverse percentage
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can add, subtract, multiply, and divide fractions, including with mixed numbers			
I can simplify and write ratios between quantities			
I can use ratios to find missing quantities in real-life contexts			
I can calculate percentages of amounts and find percentage increases and decreases			
I can convert between fractions, decimals, and percentages			
I can calculate reverse percentages			
I can calculate compound interest problems using a multiplier			

Unit sequence

1. Fractions
2. Ratios
3. Ratio and proportion
4. Percentages
5. Fractions, decimals and percentage

Top career

Insurance Underwriter

Assesses risk and premium rates using percentages for policy pricing.

Salary

£40,000 - £60,000+ per year

Useful links

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Be Inclusive

Dame Sharon White (born 1967) is a distinguished British businesswoman who studies Economics at Cambridge. She has held significant roles, including Chief Executive of Ofcom and Chair of the John Lewis Partnership, the parent company of Waitrose.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 5	**Angles and trigonometry**
Intention	To explore angle properties of shapes, calculate interior and exterior angles of polygons, and apply Pythagoras' theorem and trigonometry in solving problems.
Key words	Pythagoras theorem, trigonometry, sine, cosine, tangent, adjacent, hypotenuse
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can identify and use angle properties in triangles and quadrilaterals			
I can calculate the sum of interior angles in any polygon			
I can determine exterior angles of polygons and use them to find unknown angles			
I can apply Pythagoras' theorem to find missing sides in right-angled triangles			
I can solve real-life problems using Pythagoras' theorem			
I can use trigonometric ratios to calculate unknown sides in right-angled triangles			
I can apply trigonometry to find missing angles and sides in various contexts			

Unit sequence

1. Angle properties of triangles and quadrilaterals
2. Interior angles of a polygon
3. Exterior angles of a polygon
4. Pythagoras' theorem 1
5. Pythagoras' theorem 2
6. Trigonometry 1
7. Trigonometry 2

Top career

Civil engineer

designs, constructs, and maintains infrastructure projects, ensuring safety, functionality, and sustainability.

Salary

£70,000 - £100,000+ per year

Useful links

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Be Inclusive

Anusha Shah (born 1975) is a civil engineer who became the 159th President of the Institution of Civil Engineers in 2023. She is renowned for her expertise in sustainable development, climate adaptation, and promoting diversity in engineering.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 6	Graphs
Intention	To develop skills in interpreting, constructing, and analysing linear, quadratic, cubic, and reciprocal graphs, including real-life applications and understanding rates of change.
Key words	roots, intersection, turning point, x-axis, y-axis, midpoint, line segment
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can plot and interpret linear graphs			
I can understand and graph different rates of change in real-life contexts			
I can interpret real-life graphs to analyse situations and solve problems			
I can find the midpoint and length of line segments on a graph			
I can plot and recognise key features of quadratic graphs			
I can construct and interpret cubic and reciprocal graphs			
I can select appropriate graphs to represent relationships in various contexts			

Unit sequence

1. Linear graphs
2. More linear graphs
3. Graphing rates of change
4. Real-life graphs
5. Line segments
6. Quadratic graphs
7. Cubic and reciprocal graphs
8. More graphs

Top career

Economist

Studies resource allocation, economic trends, and advises on policies to improve financial systems.

Salary

£75,000 - £100,000+ per year

Useful links

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Esther Duflo (born 1972) is a Nobel Prize-winning economist known for her groundbreaking work in developmental economics, focusing on poverty alleviation. She co-founded J-PAL, advancing effective poverty-reduction policies globally.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 7	Area and volume
Intention	To calculate perimeter, area, and volume of various shapes, including circles, sectors, prisms, cylinders, spheres, pyramids, and cones, with accuracy.
Key words	cross section, chord, sector, segment, arc, circumference, volume, dimension
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can calculate the perimeter of various shapes accurately			
I can find the area of rectangles, triangles, and compound shapes			
I can convert between units and apply appropriate accuracy in measurements			
I can calculate the volume of prisms using cross-sectional area and height			
I can find the area and arc length of sectors in circles			
I can calculate the volume and surface area of cylinders and spheres			
I can determine the volume and surface area of pyramids and cones			

Unit sequence

1. Perimeter and area
2. Units and accuracy
3. Prisms
4. Circles
5. Sectors of circles
6. Cylinders and spheres
7. Pyramids and cones

Top career

Pharmacist

Dispenses medications, advises on safe usage, and ensures patient understanding of prescriptions and treatments, using precise medical measurements.

Salary

£50,000 - £60,000+ per year

Useful links

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@DrFrostMaths

Be Inclusive

Uğur Şahin (born 1965) and Özlem Türeci (born 1967) are pioneering scientists and founders of BioNTech, creators of the Pfizer-BioNTech COVID-19 vaccine. Their groundbreaking mRNA research, initially focused on cancer, transformed pandemic response and advanced future medical treatments.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 8	Transformations and constructions
Intention	To explore properties of 3D solids, transformations, scale drawings, bearings, and constructions, using loci to solve spatial problems and create accurate diagrams.
Key words	transformation, translation, rotation, reflection, enlargement, scale factor, column vector
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can identify and describe properties of 3D solids			
I can reflect and rotate shapes accurately on a grid			
I can enlarge shapes by a given scale factor, including fractional scale factors			
I can translate shapes and combine different transformations on a grid			
I can interpret and create scale drawings, including using bearings to find directions			
I can use compasses and rulers to construct accurate shapes and angles			
I can use loci to represent regions and solve spatial problems			

Unit sequence

1. 3D solids
2. Reflection and rotation
3. Enlargement
4. Translations and mixed transformations
5. Scale drawings and bearings
6. Constructions 1
7. Constructions 2
8. Loci

Top career

CAD Technician

Use software to create detailed 2D and 3D models for engineering, architecture, or manufacturing projects.

Salary

£35,000 - £50,000+ per year

Useful links

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@DrFrostMaths

Be Inclusive

Carol Bartz (born 1948) is a pioneering technology executive, known for transforming Autodesk into a global leader in CAD software, expanding the use of AutoCAD in architecture, engineering, and digital modelling.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 9	Equations and inequalities
Intention	To explore properties of 3D solids, transformations, scale drawings, bearings, and constructions, using loci to solve spatial problems and create accurate diagrams.
Key words	transformation, translation, rotation, reflection, enlargement, scale factor, column vector
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can identify and describe properties of 3D solids			
I can reflect and rotate shapes accurately on a grid			
I can enlarge shapes by a given scale factor, including fractional scale factors			
I can translate shapes and combine different transformations on a grid			
I can interpret and create scale drawings, including using bearings to find directions			
I can use compasses and rulers to construct accurate shapes and angles			
I can use loci to represent regions and solve spatial problems			

Unit sequence

1. Solving linear inequalities
2. Solving quadratic equations 1
3. Solving quadratic equations 2
4. Completing the square
5. Solving simple simultaneous equations
6. More simultaneous equations
7. Linear and quadratic simultaneous equations

Top career

Computer Programmer

Uses algebra to optimise logistics, resource management, and decision-making.

Salary

£70,000 - £100,000+ per year

Useful links

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Be Inclusive

Ada Lovelace (1815–1852) was a pioneering mathematician and the first computer programmer, known for her algorithm for Charles Babbage's Analytical Engine, envisioning computers' potential beyond calculations.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 10	**Probability**
Intention	To develop understanding of probability using tree diagrams, Venn diagrams, and set notation, including calculating conditional probability.
Key words	expected frequency, theoretical, experimental, dependent, conditional, independent
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
I can calculate probabilities of single and mutually exclusive events			
I can use experimental probability to make predictions about outcomes			
I can determine probabilities of independent events using tree diagrams			
I can interpret tree diagrams to solve multiple even probability problems			
I can understand and calculate conditional probability in various contexts			
I can construct and interpret Venn diagrams to represent sets and probabilities			
I can use set notation to describe and calculate probabilities within Venn diagrams			

Unit sequence

1. Combined events
2. Mutually exclusive events
3. Experimental probability
4. Independent events and tree diagrams
5. Conditional probability
6. Venn diagrams and set notation

Top career

Epidemiologist

Uses probability to study disease spread and assess health risks.

Salary

£80,000 - £120,000+ per year

Useful links

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@DrFrostMaths

Be Inclusive

Dr. Anne Schuchat (born 1960) is a renowned epidemiologist who served as Principal Deputy Director of the U.S. Centers for Disease Control and Prevention (CDC). She played pivotal roles in managing public health responses to SARS, H1N1, and COVID-19 outbreaks.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 11	**Multiplicative reasoning**
Intention	To apply multiplicative reasoning to solve problems involving growth and decay, compound measures, and ratios, and to use proportional relationships in real-life.
Key words	growth, decay, compound measures, ratio, proportion, percentage
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
Solve problems involving exponential growth and decay			
Calculate compound measures, including speed, density, and pressure			
Use ratios and proportions to solve practical problems			
Apply percentage increase and decrease in financial contexts			
Convert between units in compound measures			
Use ratio and proportion to scale recipes, designs, and models			
Interpret real-life problems using multiplicative reasoning			

Unit sequence

1. Growth and decay
2. Compound measures
3. More compound measures
4. Ratio and proportions

Top career

Transport Planner

Uses graphs to model speed, journey times, and fuel efficiency, interpreting rates of change to design better transport systems.

Salary

£40,000 - £120,000+ per year

Useful links

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Be Inclusive

Christine Darden (born 1942) is an American mathematician and engineer who worked at NASA, using mathematical modelling and graphs to analyse air resistance and improve aircraft performance.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 12	Similarity and congruence
Intention	To apply the concepts of congruence and similarity in 2D and 3D shapes, using geometric proofs and proportional reasoning to solve problems involving scale factors and relationships between shapes.
Key words	congruence, similarity, scale factor, SSS, ASA, SAS, AAS, RHS, AAA
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
Prove congruence and similarity using geometric reasoning			
Apply scale factors to lengths, areas, and volumes of similar shapes			
Use proportional reasoning to solve problems with similar shapes			
Apply geometric proofs to demonstrate congruence in triangles			
Identify similar figures in 2D and 3D			
Solve problems involving similarity in 3D solids			
Justify methods and solutions using correct terminology and reasoning			

Unit sequence

1. Congruence
2. Geometric proof and congruence
3. Similarity
4. More similarity
5. Similarity in 3D solids

Top career

Structural engineer

Uses geometry, scale, and volume calculations to ensure buildings and bridges are both efficient and structurally safe.

Salary

£40,000 - £80,000+ per year

Useful links

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Be Inclusive

Zaha Hadid (born 1950 - 2016) was a renowned architect whose innovative designs combined complex geometry with engineering, transforming the use of shapes and space in modern architecture.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 13	**More trigonometry**
Intention	To apply trigonometric functions and identities to solve problems in 2D and 3D, including graph transformations, using sine, cosine, and tangent functions.
Key words	sine, cosine, tangent, transformation, sine rule, cosine rule
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
Plot and interpret the graphs of sine, cosine, and tangent functions			
Solve 2D problems using the sine rule and cosine rule			
Calculate areas using the sine rule			
Solve 3D trigonometric problems involving angles and distances			
Apply trigonometric identities and functions in real-life contexts			
Transform trigonometric graphs using shifts, stretches, and reflections			
Ensure accuracy in trigonometric calculations, rounding appropriately			

Unit sequence

1. Accuracy
2. Graph of the sine function
3. Graph of the cosine function
4. Graph of the tangent function
5. Calculating area and the sine rule
6. The cosine rule and 2D trigonometric problems
7. Solving problems in 3D
8. Transforming trigonometric graphs 1
9. Transforming trigonometric graphs 2

Top career

Land surveyor

Uses trigonometry, scale drawings, and accurate constructions to map land, establish boundaries, and support engineering and architectural projects.

Salary

£40,000 - £60,000+ per year

Useful links

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Be Inclusive

Elena Manferdini (born 1974) is an Italian American architect and engineer known for her precise use of geometry and transformations in cutting-edge architectural design, blending art, maths, and engineering.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 14	**Further statistics**
Intention	To analyse and interpret statistical data using sampling, cumulative frequency, box plots, and histograms, and to compare and describe distributions effectively through graphical and numerical methods.
Key words	sampling, cumulative frequency, box plot, histogram, distribution, outliers
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
Collect and analyse data using appropriate sampling techniques			
Construct and interpret cumulative frequency diagrams			
Create and interpret box plots to summarise data			
Draw and interpret histograms, identifying key features			
Compare and describe distributions using measures of central tendency and spread			
Identify outliers and explain their impact on data analysis			
Use statistical diagrams to make informed decisions and conclusions			

Unit sequence

1. Sampling
2. Cumulative frequency
3. Box plots
4. Drawing histograms
5. Interpreting histograms
6. Comparing and describing distributions

Top career

Data analyst

Uses equations and inequalities to model trends in large data sets in business.

Salary

£40,000 - £100,000+ per year

Useful links

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https://mmerevise.co.uk/gcse-maths-revision/
https://www.thenational.academy/pupils/years/
https://www.maths4everyone.com/

YouTube channels

@ExamSolutions_Maths
@1stClassMaths
@mathsgenie7808
@corbettmaths
@mathsmadeeasy123
@TheGCSEMathsTutor
@Cognitoedu
@DrFrostMaths

Be Inclusive

Florence Nightingale (1820–1910) was a pioneering nurse and statistician who used statistical graphics, including histograms and box plots, to improve healthcare by highlighting sanitation's impact on mortality rates.

Langdon Park School
Mathematics

Year 10H
Unit Overview

Unit 15	Equations and graphs
Intention	To solve simultaneous, quadratic, and cubic equations graphically, represent inequalities, and use iteration methods to find solutions, applying these techniques to real-world mathematical problems.
Key words	simultaneous equations, quadratic, cubic, iteration, inequalities, roots, intercepts
Study	https://sites.google.com/langdonpark.org/maths/study/key-stage-4

Success criteria	R	A	G
Solve simultaneous equations by plotting graphs and finding intersections			
Represent and interpret inequalities graphically			
Solve quadratic equations using factorisation, graphs, and the quadratic formula			
Analyse and interpret quadratic graphs			
Solve cubic equations and interpret cubic graphs			
Use iteration methods to approximate solutions to equations			
Apply graphical and numerical methods to solve real-life problems			

Unit sequence

1. Solving simultaneous equations graphically
2. Representing inequalities graphically
3. Quadratic equations
4. Using quadratic graphs
5. Cubic equations
6. Using iteration to solve equations

Top career

Data Scientist

Uses graphing and iterative methods to model and solve complex problems in business

Salary

£50,000 - £120,000+ per year

Useful links

https://www.sparxmaths.uk/
https://sites.google.com/langdonpark.org/maths
https://www.1stclassmaths.com/edexcelrevision
https://www.mathsgenie.co.uk/
https://corbettmaths.com/
https://mmerevise.co.uk/gcse-maths-revision/
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@TheGCSEMathsTutor
@Cognitoedu
@DrFrostMaths

Be Inclusive

Mary Jackson (1921–2005) was a pioneering African American mathematician and aerospace engineer at NASA, using advanced equations and graphical methods to solve problems related to flight dynamics and engineering designs.