Maths

ALDER
Community High School

Year 11

Key information

Low Stakes Assessment

Each topic outlined below will be assessed via an Exit Ticket at the end of the unit of learning. This will be teacher marked and whole class feedback will be provided.

Summative Assessment

Students will sit multiple mock GCSE assessments across the year that indicate their current grade and inform predicted grades used for college applications. Students will be provided with the GCSE content list in advance and are expected to revise independently for these assessments.

ILS

- In term 1, students in Y11 are expected to complete a set of topic-specific exam questions each week. These will be handed in on Wednesdays and self-marked in a lesson later in the week.
- In term 2 and 3, students in Y11 are expected to complete and self-mark a weekly past paper. Prior to the paper being issued, teachers will work through a set of similar questions in lesson that students can use as a worked example when completing the paper at home.
- Key vocabulary should be practiced using flashcards or self-quizzing from the unit knowledge organiser.

Wider Reading

- Students can look in more depth at each unit of learning via the Sparx Maths Independent Learning function. This has videos and practice questions for self-study.
- Students can use revision guides for wider reading on a topic.
- Students can use BBC Bitesize for wider reading on a topic.

SMSC

Students spiritual, moral, social and cultural development is fostered in maths through discussion activities in which different perspectives on a problem are discussed. Students are exposed to the work of a vast array of mathematicians through the curriculum and explicit cultural links to art, architecture and language are made where appropriate.

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Autumn Term

Foundation Consolidation:

- Using Graphs
- Basic Trigonometry
- Inequalities and Representing Solutions
- Simultaneous Equations

Higher Consolidation:

- Inequalities and Representing Solutions
- Simultaneous Equations
- Advanced Trigonometry

G8. Working with Circles

Composites

- Circumference and arc length
- Area of circles and sectors
- Volume of prisms and cylinders
- Surface area of prims and cylinders

Composites (Higher Only)

- Similar areas and volumes
- Circle theorems:
- Angles at the centre and circumference
- Angles in a semi-circle
- Angles in a cyclic quadrilateral
- Angles in the same segment

Key Vocabulary

Arc	A portion of the circumference.
Diameter	A line segment connecting two points on the circumference of a circle passing through the centre.
Radius	A line segment connecting the centre to the circumference of a circle.
Sector	A portion of the circle enclosed by two radii and an arc.

How to help at home

- Arc Length Video (Corbett Maths)
- Area of a Sector Video (Corbett Maths)
- Surface Area Video (Corbett Maths)
- Volume Video (Corbett Maths)
- Similar Areas Video (Corbett Maths)
- Similar Volumes Video (Corbett Maths)
- Circle Theorems Video (Corbett Maths)

Careers Links

These topics are essential in careers such as architecture, engineering, construction, manufacturing, surveying and product design, where professionals calculate lengths, areas, volumes and surface areas to design structures, estimate materials, manufacture components and ensure projects are accurate, safe and cost-effective. They also develop spatial reasoning, precision and problem-solving skills that are highly valued across STEM industries.

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G9. Vectors

Composites

- Vector notation
- Vector multiplication
- Vector addition and subtraction

Composites (Higher Only)

- Vectors in shapes
- Parallel and colinear vectors
- Geometric proof

Key Vocabulary

Co-Linear	Vectors that create a straight line due to being parallel and sharing a common point.
Magnitude	Size (of a number or the length of a vector).
x-component	The top number in a column vector, this describes the movement in the x direction.
y-component	The bottom number in a column vector, this describes the movement in the y direction.

How to help at home

- Column Vectors Video (Corbett Maths)
- Vectors Video (Corbett Maths)

Careers Links

These topics are used in careers such as engineering, architecture, computer graphics, robotics, physics and surveying, where professionals use vectors to represent direction and magnitude, model movement and forces, design structures, and prove geometric relationships. They develop logical reasoning, spatial awareness and analytical problem-solving skills that are essential in many STEM careers.

A9. Non-Linear Graphs

Composites

- Plot and read quadratic, cubic and reciprocal graphs
- Recognise graph shapes
- Roots and intercepts of quadratics

Composites (Higher Only)

- Plot and read exponential graphs
- Equations of circles
- Equation of a tangent

Key Vocabulary

Asymptote	A straight line that a graph will never meet.
Cubic	A curved graph with an equation of the form $y=ax^3+bx^2+cx+d$.
Quadratic	A U-shaped graph with an equation of the form $y=ax^2+bx+c$.
Reciprocal (Graph)	A graph with two curves, an asymptote and an equation of the form $y=\frac{k}{x}$.

How to help at home

- Plotting Quadratic Graphs Video (Corbett Maths)
- Cubic Graphs Video (Corbett Maths)
- Exponential Graphs Video (Corbett Maths)
- Reciprocal Graphs Video (Corbett Maths)
- Equation of a Circle Video (Corbett Maths)
- Equation of a Tangent Video (Corbett Maths)

Careers Links

These topics are used in careers such as engineering, architecture, computer science, data science, physics and game development, where professionals model real-world situations, analyse graphical data, design curved structures, and use equations to solve complex problems. They develop analytical thinking, mathematical modelling and interpretation skills that are essential across STEM and technology-based industries

N11. Non-Calculator Methods

Composites

- Exact Form
- Rounding and truncating numbers
- Error Intervals
- Estimating Calculations
- Fraction Arithmetic
- Solving Multi-Step Problems

Composites (Higher Only)

- Evaluating negative fractional indices
- Expanding with surds
- Rationalising the denominator
- Converting recurring decimals to fractions

Key Vocabulary

Bound	The maximum or minimum value that a number could have been before it was rounded.
Degree of Accuracy	How close something is to the true value
Exact Form	A value that has not been approximated (often a surd, fraction or in terms of pi).
Rounding	Approximating to the nearest bound.
Truncating	Approximating to the lower bound.

How to help at home

- Error Intervals Video (Corbett Maths)
- Estimating Calculations Video (Corbett Maths)
- Additive Operations with Fractions Video (Corbett Maths)
- Multiplying Fractions Video (Corbett Maths)
- Dividing Fractions Video (Corbett Maths)
- Rationalising Denominators Video (Corbett Maths)
- Recurring Decimals to Fractions Video (Corbett Maths)

Careers Links

These topics are used in careers such as engineering, construction, science, finance, pharmacy and manufacturing, where professionals perform accurate calculations, estimate values, manage measurement tolerances, and work with exact values to ensure precision and reliability. They develop numerical fluency, attention to detail and problem-solving skills that are essential in technical and analytical professions

A10. Functions

Composites

- Substitute into functions
- Forming Expressions
- Trig Functions

Composites (Higher Only)

- Composite functions

Key Vocabulary

Function	A rule that connects an input value to one output value.
Inverse	A mathematical opposite.

How to help at home

- Functions (BBC Bitesize)

Please note students do not need to understand and use function notation (e.g. f(x)), all function questions on OCR use function machines.

Careers Links

These topics are used in careers such as engineering, computer programming, data science, physics, architecture and game development, where professionals use functions, algebraic expressions and trigonometry to model real-world situations, design systems, analyse data and solve complex problems. They develop logical thinking, mathematical modelling and problem-solving skills that are highly valued across STEM and technology-based careers.

A11. Manipulating Expressions

Composites

- Form and solve equations and inequalities with fractions
- Algebraic argument and proof
- Simplify complex expressions

Composites (Higher Only)

- Completing the square
- Finding turning points
- Simplifying Algebraic Fractions
- Additive and multiplicative operations with algebraic fractions

Key Vocabulary

Identity	A mathematical relationship stating two expressions are equivalent.
Proof	A logical step-by-step argument that demonstrates that a mathematical statement is true.
Solve	To find a numerical value that satisfies a mathematical relationship (makes it true).

• Solving Algebraic Fraction Equations	
How to help at home • Refer to the 'Algebra Tiles' video on the Alder Maths Department page • Algebraic Proof Video (Corbett Maths) • Completing the Square Video (YouTube) • Simplifying Algebraic Fractions Video (Corbett Maths) • Additive Operations with Algebraic Fractions Video (Corbett Maths) • Multiplying Algebraic Fractions Video (Corbett Maths) • Dividing Algebraic Fractions Video (Corbett Maths)	**Careers Links** These topics are used in careers such as engineering, computer science, economics, actuarial science, data analysis and scientific research, where professionals manipulate algebraic expressions, solve complex equations, model relationships and justify solutions using mathematical proof. They develop logical reasoning, analytical thinking and advanced problem-solving skills that are essential across STEM and analytical professions.

Spring Term

P7. Collecting, Representing & Interpreting Data 3

Composites
- Averages from lists and tables
- Reverse mean
- Averages problems
- Comparing distributions

Composites (Higher Only)
- Drawing and interpreting histograms
- Drawing and interpreting cumulative frequency diagrams
- Box Plots

Key Vocabulary

Mean	A type of average - the sum of the data divide by the number of items.
Median	A type of average - the middle piece of data in an ordered list.
Mode	A type of average - the most frequent piece of a data in a set.

How to help at home
- Averages from an Ungrouped Table (BBC Bitesize)
- Averages from a Grouped Table (BBC Bitesize)

Careers Links
These topics are used in careers such as data analysis, medicine, finance, market research, engineering and quality control, where professionals

• Drawing Histograms Video (Corbett Maths) • Interpreting Histograms Video (Corbett Maths) • Histograms GCSE Qus Video (Corbett Maths) • Drawing Cumulative Frequency Video (Corbett Maths) • Interpreting Cumulative Frequency Video (Corbett Maths) • Drawing Box Plots Video (Corbett Maths) • Comparing Box Plots Video (Corbett Maths)	collect, interpret and compare data to identify trends, make informed decisions and communicate findings clearly. They develop statistical reasoning, analytical thinking and data-handling skills that are essential across many scientific, business and technical careers.

G10. Transforming & Constructing

Composites

- Reflection
- Rotation
- Translation
- Enlargement
- Identifying transformations and series of transformations
- Constructions and loci

Composites (Higher Only)

- Negative enlargement
- Invariant points
- Trigonometric graphs
- Transformations of trigonometric graphs

Key Vocabulary

Construct	Create an accurate drawing using a pencil, ruler, compass and/or protractor.
Enlargement	Changing the size of a shape.
Reflection	A transformation mapping an object from one position to another of equal distance from a given line.
Rotation	A transformation that turns an object in a given direction.
Translation	A transformation moving an object in a vector with an x and y component.

How to help at home

- Transforming Trig Graphs Video (Corbett Maths)
- Negative Enlargements Video (Corbett Maths)
- Invariant Points Video (Corbett Maths)
- Translation with Vectors (Corbett Maths)
- Rotations Video (Corbett Maths)
- Reflections Video (Corbett Maths)
- Enlargements Video (Corbett Maths)

Careers Links

These topics are used in careers such as architecture, engineering, computer graphics, animation, robotics, surveying and design, where professionals use geometric transformations, constructions and trigonometric models to create accurate designs, analyse movement, map locations and develop digital models. They develop spatial reasoning, precision and problem-solving skills that are highly valued across engineering, technology and creative industries.

R5. Multiplicative Reasoning

Composites

- Using Scale Factors
- Proportion Equations
- Proportion Problems
- Speed, Distance, Time Problems
- Density, Mass, Volume
- Pressure, Force, Area
- Multiplicative Problems

Composites (Higher Only)

No additional content in this unit

Key Vocabulary

Density	A property measuring how tightly packed particles of a substance are.
Pressure	The amount of force applied perpendicularly to a given area.
Proportion	A relationship that describes how two things change in relation to each other.
Scale Factor	A multiplier describing a change in size.
Speed	The rate at which an object covers distance.

How to help at home

- Refer to the 'Ratio Tables' video on the Alder Maths Department page
- SDT Video (Corbett Maths)
- DMV Video (Corbett Maths)
- PFA Video (Corbett Maths)

Careers Links

These topics are used in careers such as engineering, construction, logistics, architecture, transport, science and manufacturing, where professionals apply proportional reasoning to calculate scale, speed, density, pressure and force when designing structures, planning journeys, testing materials and solving practical problems. They develop mathematical modelling, problem-solving and quantitative reasoning skills that are essential across many technical and scientific careers.

G11. Geometric Reasoning

Composites

- Angles in parallel lines and shapes
- Interior and exterior angles of polygons
- Proving geometric facts
- Pythagoras and Trigonometry

Key Vocabulary

Exterior Angle	An angle created by extending the side of a polygon.
Hypotenuse	The longest side on a right-angled triangle. It is always opposite the right angle.

Composites (Higher Only) • Circle theorems: - Recap of theorems form G8 - Angle between the radius and chord - Angle between radius and tangent - Two tangents from a point - Alternate segment theorem	Interior Angle — An angle inside a shape. Parallel — Two straight lines that never intersect and are always the same distance apart (the same gradient).
How to help at home • Circle Theorems Video (Corbett Maths) • Angles in Parallel Lines (BBC Bitesize) • Pythagoras Video (Corbett Maths) • Trigonometry (BBC Bitesize)	**Careers Links** These topics are used in careers such as architecture, engineering, construction, surveying, aviation and computer graphics, where professionals apply geometric reasoning, angle properties, trigonometry and circle theorems to design structures, calculate distances, produce accurate plans and solve spatial problems. They develop logical reasoning, precision and problem-solving skills that are essential across STEM and technical professions.

A12. Algebraic Reasoning

Composites • Use rules for sequences • Show that with algebra • Show that with shape	**Key Vocabulary** nth term — A position to term rule for a sequence. Show that — To produce step-by-step working leading to a given conclusion.
Composites (Higher Only) *No additional content in this unit*	
How to help at home • Exam Practice – Past Papers OCR	**Careers Links** These topics are used in careers such as computer programming, engineering, architecture, data science and scientific research, where professionals identify patterns, develop mathematical models and use algebra to predict and explain relationships. They develop logical reasoning,

<table>
<tr><td></td><td>analytical thinking and problem-solving skills that are highly valued across STEM and technology-based careers.</td></tr>
<tr><td colspan="2"><h2>P8. Listing & Describing</h2></td></tr>
<tr><td>Composites
Systematic Listing
Show that with probability
Exam-Style Problems</td><td rowspan="2">Key Vocabulary
Probability — The likelihood of an event happening.
Show that — To produce step-by-step working leading to a given conclusion.</td></tr>
<tr><td>Composites (Higher Only)
Product rule for counting</td></tr>
<tr><td>How to help at home
Exam Practice - Past Papers OCR
Product Rule Video (Corbett Maths)</td><td>Careers Links
These topics are used in careers such as data science, actuarial science, finance, computer science, logistics and scientific research, where professionals calculate probabilities, organise outcomes systematically and evaluate possible scenarios to support informed decision-making and risk assessment. They develop logical reasoning, analytical thinking and problem-solving skills that are valuable across a wide range of STEM and business careers.</td></tr>
<tr><td colspan="2"><h2>N12. Numerical Reasoning</h2></td></tr>
<tr><td>Composites
Show that with number</td><td rowspan="2">Key Vocabulary
Show that — To produce step-by-step working leading to a given conclusion.</td></tr>
<tr><td>Composites (Higher Only)
Quadratic sequences
Calculating with bounds</td></tr>
<tr><td>How to help at home
Exam Practice – Past Papers OCR</td><td>Careers Links</td></tr>
</table>

• Quadratic Sequences Video (Corbett Maths) • Bounds Calculations Video (Corbett Maths)	These topics are used in careers such as engineering, data science, finance, scientific research and quality assurance, where professionals identify patterns, model relationships, work with measurement accuracy and justify numerical conclusions using mathematical reasoning. They develop analytical thinking, precision and problem-solving skills that are essential across STEM and technical professions.

Summer Term – Revision & Examinations