

De Lisle College Curriculum

“Rooted and grounded in Love”.

Mathematics



Intent – ‘Rooted and grounded in Love’

Intent – Rooted

At the heart of our curriculum is the belief that every young person can become confident Mathematicians. The development of Mathematical literacy is an issue of Social Justice; no child should leave school Mathematically illiterate. Our aim is to nurture and inspire, support and challenge, so that all students reach their full potential.

At De Lisle College, we teach for Mastery. Our curriculum is sequenced to enable students to master a topic before moving on to the next one. It is only by having a firm understanding of what has been taught, will you be confident in attempting what follows.

All students at De Lisle College follow the same curriculum. Year 7 acts as a bridge to what has been taught at primary school; mastering the core concepts of Mathematics, to act as building blocks for future years. Number and Algebra feature heavily as these are crucial components of future topics. The remainder of the Key Stage 3 curriculum interleaves and builds on these concepts, whilst introducing other areas of Mathematics, namely Statistics and Probability.

Students are placed into tiers at the beginning of Key Stage 4, to ensure the curriculum fully meets their needs and enables them to flourish. Concepts and topics from Key Stage 3 are revisited and built upon, to deepen students understanding and prepare them for their exams. Time is dedicated in year 11 to reteach prior content, ensuring all students feel confident and secure in their understanding of what has been taught.

Maths is very popular at KS5. Our knowledge rich curriculum exposes students to a range of new content, including mechanics and calculus; developing their analytical and logical thinking skills to inspire, challenge and ultimately prepare students for higher education and a career in STEM.

Ultimately our intent rests on three core principles. Every child should experience the joy of Mathematical thinking and understanding; that feeling of solving a really challenging problem. Every child should leave school Mathematically literate, confident and unintimidated by the subject. Every child deserves an outstanding Mathematics education.



Maths

Year 7



De Lisle College
A Catholic Voluntary Academy

Curriculum Outline

Link to Catholic Social Teaching:

As a department we recognise that year 7 is a period of transition from primary school, with students arriving into the college having had very different Mathematical experiences at Primary School. We also know the importance of a good Mathematical education and see it as our duty to ensure that every student develops strong Mathematical literacy and flourishes in a subject that can be challenging, yet is incredibly important. This links to the CST principle of the dignity of all people. We explore the CST principle of solidarity in multiple units in year 7. When introducing algebra for the first time we explore the origins of algebra. When looking at written methods of calculation, we expose students to a range of methods that have been developed and are used in different countries.

Advent 1	Linear and Non-linear Sequences / Algebraic Notation / Equality and Equivalence	Advent 2	Place Value / Fractions, Decimals & Percentages
Description	- Identify linear and non-linear sequences - Understand the basics of algebraic notation and how to solve problems using inverse operations - Understand equality and equivalence to solve equations and simplify expressions by collecting like terms	Description	- Order numbers using place value and be able to round to different degrees of accuracy - Convert fluently between fractions, decimals & percentages
Lent 1	Addition and Subtraction / Multiply and Divide	Lent 2	Fraction and Percentage of Amounts / Directed (negative) Number / Add and Subtract with Fractions
Description	- Use addition and subtraction fluently in a range of different contexts Multiply and divide numbers without a calculator, find the mean of a set of values and find the areas of different shapes	Description	- Find the fraction and percentage of amounts - Calculate with directed (negative) number in numeric and algebraic contexts Add and subtract with fractions including with mixed numbers and improper fractions
Pentecost 1	Angles / Geometric Reasoning / Number Sense	Pentecost 2	Set Notation to Explore Probability / Prime Numbers
Description	- Measure angles, recognise different shapes and draw constructions of triangles - Use geometric reasoning with basic angle facts to explore different shapes and parallel lines - Develop my number sense by using mental arithmetic and number facts	Description	- Represent data in Venn diagrams using set notation to explore probability - Recall prime numbers and work with factors and multiples to solve problems

Maths

Year 8

Curriculum Outline

Link to Catholic Social Teaching:

The work looking at sharing in a given ratio allows us to explore themes such as the equitable distribution of resources, which links to the principles of subsidiarity and option for the poor. When looking at fractions of amounts and percentage change, the context of the questions we pose allow us to explore multiple principles of CST, including subsidiarity and the common good.

The work on representing and interpreting data allows students to recognise inequalities, identify trends (e.g., in healthcare or education), and make informed judgments. This supports the principle of the common good. The data that we present to the students also allows us to explore different contexts and scenarios linked to the principles of CST.

Advent 1	Ratio / Multiplicative Change / Multiply and Divide Fractions	Advent 2	Cartesian Plane / Represent Data / Probabilities
Description	- Understand how to simplify with ratio and share amounts in a given ratio - Solve problems using multiplicative change involving direct proportion and scale factors Multiply and divide fractions including improper fractions and mixed numbers	Description	- Plot coordinate points, draw graphs and work in the Cartesian plane Represent data using scatter graphs, lines of best fit and understand frequency tables Find probabilities from sample space diagrams, two-way tables and Venn diagrams
Lent 1	Brackets, Equations & Inequalities / Sequences / Indices	Lent 2	Fractions of Amounts and Percentage Change / Standard Index Form / Number Sense
Description	- Solve problems involving brackets, equations & inequalities including factorising and expanding brackets - Generate sequences given a rule and find the nth term of linear sequences - Understand the laws of indices and use them to simplify problems	Description	- Calculate fractions of amounts and understand percentage change - Write numbers in standard index form and calculate with them - Use number sense to round numbers, calculate with money and convert between metric units

Pentecost 1	Angles in Parallel Lines & Polygons / Trapezia and Circles / Line Symmetry	Pentecost 2	Data Handling Cycle / Measure of Location
Description	- Understand how to solve problems with angles in parallel lines & polygons - Find the area of basic shapes and also trapezia and circles - Reflect shapes using line symmetry	Description	- Use the data handling cycle to draw and interpret bar charts, line graphs & pie charts along with calculating averages - Understand measures of location to find mean from grouped data

Maths

Year 9



De Lisle College
A Catholic Voluntary Academy

Curriculum Outline

Link to Catholic Social Teaching:

The unit on straight line graphs incorporates real life graphs, including those exploring direct and inverse proportion. The context of those questions allows us to incorporate the CST principle of the common good.

When looking at Maths with Money, we teach students about the importance of financial responsibility and link this to the CST principles of participation, stewardship as well as option for the poor.

When looking at reverse percentages and percentage change, the context of the questions we pose allow us to explore multiple principles of CST, including subsidiarity and the common good.

Advent 1	Straight Line Graphs / Equations and Inequalities	Advent 2	Test Conjectures / 3D Shapes / Constructions and Congruency
Description	- Draw straight line graphs, write the equation of a straight line and understand lines that are parallel and perpendicular - Solve equations and inequalities, including those with unknowns on both sides, while also being able to rearrange formulae	Description	Test conjectures to prove whether they are always, sometimes or never true - Recognise different 3D shapes, drawing nets, plans and elevations and finding the total surface area and volume - Draw accurate constructions of loci & bisectors and also recognise congruency with triangles
Lent 1	Number Skills / Reverse and Repeated Percentage Change	Lent 2	Maths with Money / Geometric Reasoning / Rotate and Translate Shapes
Description	- Use my number skills to calculate with surds, solve problems in context and recap my skills with fractions and standard form - Solve problems with reverse and repeated percentage change	Description	- Use maths with money by calculating interest, finding prices with VAT, calculating wages and taxes and solving problems with exchange rates - Use skills of deduction to solve problems with angles using geometric reasoning Rotate and translate shapes around lines and coordinate points

Pentecost 1	Pythagoras' Theorem / Enlarge Shapes and Recognise Similarity / Proportion and Ratio	Pentecost 2	Compound Measures / Probability / Algebraic Representation
Description	• Use Pythagoras' theorem to find missing lengths • Enlarge shapes and recognise similarity, including with fractional and negative scale factors • Solve problems involving direct proportion, inverse proportion and ratio	Description	• Understand compound measures when looking at rates of flow, speed, density and distance-time graphs • Use tree diagrams to solve problems with probability • Interpret quadratic graphs and those of simultaneous equations which demonstrate algebraic representation

Maths

Year 10



De Lisle College
A Catholic Voluntary Academy

Curriculum Outline

Link to Catholic Social Teaching:

We link the principle of solidarity to our teaching of Pythagoras and Trigonometry, exploring the origins of these disciplines.

When looking at ratios and percentages the context of the questions we pose allow us to explore multiple principles of CST, including subsidiarity and the common good.

The work on representing and interpreting data allows students to recognise inequalities, identify trends (e.g., in healthcare or education), and make informed judgments. This supports the principle of the common good. The data that we present to the students also allows us to explore different contexts and scenarios linked to the principles of CST.

Advent 1	Enlarge Shapes and Congruent Triangles / Pythagoras' Theorem and Trigonometry	Advent 2	Algebraic Equations and Inequalities / Simultaneous Equations / Understand and Represent Bearings / Calculate with Circles
Description	• Enlarge shapes, identify and find angles in similar shapes and parallel lines and understand how to use congruent triangles. <i>Higher Tier additional content: understand area and volume of similar shapes, enlarge with negative scale factors and prove congruency.</i> • Use Pythagoras' theorem and understand how to use SOHCAHTOA to find missing angles and sides using trigonometry. <i>Higher Tier additional content: use trigonometry in 3D shapes, use the sine rule and cosine rule and also find the area of triangles using $\frac{1}{2}ab\sin C$.</i>	Description	• Solve one-step and two-step algebraic equations and inequalities and represent solutions on graphs and form and solve equations and inequalities with unknowns on both sides. <i>Higher Tier additional content: represent inequalities on graphs and solve quadratic equations and inequalities.</i> • Solve and form pairs of linear simultaneous equations algebraically and using graphs <i>Higher Tier additional content: solve simultaneous equations algebraically and graphically where one equation is quadratic or where there is a third unknown.</i> • Understand and represent bearings, make scale drawings and calculate bearings using angle rules including using trigonometry and Pythagoras. <i>Higher Tier additional content: solve bearings problems using the cosine and sine rules.</i> • Calculate with circles finding arc lengths and the area of sectors, understand how to find the volume of cylinders, cones and spheres and find the surface area of those shapes. <i>Higher Tier additional content: solve problems using circle some basic circle theorems and solve area and volume problems with similar shapes.</i>

Lent 1	Vectors / Ratios and Fractions	Lent 2	Compound interest, Fractions, Decimals and Percentages / Probabilities
Description	- Understand, represent, draw and calculate with vectors using the correct notation. <i>Higher Tier additional content: use vectors in shapes and parallel situations.</i> - Compare and share amounts into given ratios, link ratios and fractions, solve problems with currency and best buy scenarios and link ratios to graphs and algebra. <i>Higher Tier additional content: solve ratio problems with area and volume.</i>	Description	- Calculate simple and compound interest, convert between fractions, decimals and percentages, find repeated percentage change and work out percentages of amounts. <i>Higher Tier additional content: understand the iterative process.</i> - Use experimental data to estimate probabilities, find probabilities from Venn diagrams and frequency trees and use tree diagrams to explore independent and dependent events. <i>Higher Tier additional content: construct and interpret conditional probabilities.</i>
Pentecost 1	Data / Non-calculator Methods	Pentecost 2	Arithmetic and Geometric Sequences / Indices and Roots / Manipulate Expressions
Description	Collect, represent and interpret data, knowing the difference between primary and secondary data, construct frequency polygons and tables, construct and interpret bar and line charts, find and interpret averages, compare distributions, construct and interpret scatter graphs and draw and use lines of best fit. <i>Higher Tier additional content: construct and interpret histograms, stratified samples, cumulative frequency diagrams and box plots.</i> - Use non-calculator methods to estimate and round numbers using limits of accuracy, use the four operations fluently and solve financial maths problems <i>Higher Tier additional content: work with rational and irrational numbers, calculate with surds and find upper and lower bounds.</i>	Description	- Understand arithmetic and geometric sequences finding the nth term rule, identify different types of number and calculate the highest common factor (HCF) and the lowest common multiple (LCM). <i>Higher Tier additional content: continue sequences involving surds and find the nth term of a quadratic sequence.</i> - Calculate with indices and roots, working with powers of ten and standard form. <i>Higher Tier additional content: understand and use fractional indices.</i> - Know how to manipulate expressions, simplifying expressions, use identities and form and solve equations and inequalities with fractions. <i>Higher Tier additional content: add, subtract, multiply and divide algebraic fractions.</i>

Maths

Year 11

Curriculum Outline

Link to Catholic Social Teaching:			
Advent 1	Straight Line Graph / Non-Linear Graphs / Graphs	Advent 2	Expand and Factorise Equations / Subject Change of Formulae and Form / Multiplicative Reasoning
Description	- Plot straight line graphs, identify gradients and intercepts of lines in the equation of the form $y=mx + c$, find the equation of lines from graphs and solve simultaneous equations graphically. If I am studying higher tier I will also explore perpendicular lines and their equations. - Plot and read from non-linear graphs including, quadratic, cubic and reciprocal graphs. If I am studying higher tier I will also be able to understand exponential graphs, find and use the equation of a circle and tangents to any curve. Use graphs to reflect shapes, construct conversion graphs, interpret distance-time graphs, speed-time graphs and graphs which illustrate direct and indirect proportion. If I am studying higher tier I will also be able to estimate the area under a curve.	Description	Expand and factorise equations, including single brackets & binomials. Solve quadratic equations equal to zero. If I am studying higher tier I will also be able to solve complex quadratic equations, complete the square and use the quadratic formula. Change the subject of formulae and form and solve equations and inequalities. If I am studying higher tier I will also be able to change the subject when it appears more than once and also use iteration. - Use multiplicative reasoning to understand direct & inverse proportion, calculate with pressure & density & solve ratio problems. If I am studying higher tier I will also be able to construct complex direct and inverse proportion equations.

Lent 1	Geometric Reasoning / Algebraic Reasoning	Lent 2	Transformations and Constructions / Probability of Diagrams
Description	- Use geometric reasoning to identify angles at a point, in parallel lines and in shapes, find interior and exterior angles and prove geometric facts including with vectors and Pythagoras. If I am studying higher tier I will also be able to use circle theorems. - Use algebraic reasoning to simplify complex expressions, find the nth term rule of linear sequences and solve linear simultaneous equations. If I am studying higher tier I will also be able to find the nth term for quadratic sequences, solve simultaneous equations with quadratics and use formal algebraic proof.	Description	- Use transformations and constructions to reflect, rotate, translate and enlarge shapes and solve loci problems. If I am studying higher tier I will also be able to solve problems with trigonometrical graphs including transformations of them. List and describe using probability, including Venn diagrams and sample space diagrams. Draw plans and elevations and interpret scatter graphs.
Pentecost 1	Revision & Exams	Pentecost 2	Revision & Exams
Description	/	Description	/