

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 at 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 and substitution / Equality and Equivalence                                                                                                                                                                                                                                                                            | Advent 2    | Place Value / Four operations/Averages and range/Rounding and estimation                                                                                                                                                                                                                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description | <ul style="list-style-type: none"> <li>Identify linear and non-linear sequences.</li> <li>Understand the basics of algebraic notation and how to solve problems using inverse operations.</li> <li>Understand equality and equivalence to solve equations and simplify expressions by collecting like terms.</li> </ul>                                                     | Description | <ul style="list-style-type: none"> <li>Order numbers using place value and be able to round to different degrees of accuracy. Estimate calculations by rounding to 1SF.</li> <li>Add/subtract/multiply/divide with integers and decimals.</li> <li>Calculate and interpret averages and range.</li> <li>Use and understand error interval notation.</li> </ul> |
| Lent 1      | Graphing data / Fractions, decimals and percentages                                                                                                                                                                                                                                                                                                                         | Lent 2      | Directed number / Fraction and Percentage of Amounts/ Perimeter and area                                                                                                                                                                                                                                                                                       |
| Description | <ul style="list-style-type: none"> <li>Draw and interpret pictograms and bar charts including dual and composite. Plot a scatter graph, describe correlation, draw and use a line of best fit.</li> <li>Work with tenths, hundredths, fifths, quarters, eighths and thousandths. Understand percentages and convert between fractions, decimals and percentages.</li> </ul> | Description | <ul style="list-style-type: none"> <li>Find fraction and percentages of amounts.</li> <li>Calculate with directed (negative) number in numeric and algebraic contexts.</li> <li>Convert between metric units of length. Calculate the perimeter and area of compound shapes including parallelograms, trapezia and forming algebraic expressions.</li> </ul>   |

| Pentecost 1 | Speed, distance and time / Properties of number                                                                                                                                                                                                                                                                                                                                                                                            | Pentecost 2 | Add and subtract fractions / Angles and polygons                                                                                                                                                                                                                                              |
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| Description | <ul style="list-style-type: none"> <li>• Convert between units of time. Solve problems with timetables and calendars. Calculate and solve problems with speed, distance and time including constructing and interpreting distance/time graphs.</li> <li>• Recognise and solve problems with factors, multiples, primes, square and cube numbers, square and cube roots and triangular numbers. Explore higher powers and roots.</li> </ul> | Description | <ul style="list-style-type: none"> <li>• Add and subtract fractions including with mixed and improper fractions.</li> <li>• Use geometric notation accurately. Calculate using angle facts, recognise and name polygons and calculate with angles in triangles and quadrilaterals.</li> </ul> |

# 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.

| <b>Advent 1</b> | <b>Ratio / Proportion and scale / Algebraic manipulation</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Advent 2</b> | <b>Coordinates and graphs / Multiply and divide fractions / Symmetry and reflection</b>                                                                                                                                                                                                                                                                                                                                 |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description     | <ul style="list-style-type: none"> <li>Understand how to simplify with ratio and share amounts in a given ratio including in the form <math>n : 1</math> and <math>1 : n</math>.</li> <li>Solve problems involving direct proportion and scale factors. Convert between currencies and metric units and interpret maps.</li> <li>Identify expressions, identities, formulae and equations. Substitute into an expression including with directed number. Expand and simplify multiple single brackets.</li> </ul> | Description     | <ul style="list-style-type: none"> <li>Plot coordinate points, draw and explore graphs in the form <math>y = mx + c</math>, calculate midpoints and plot quadratic graphs.</li> <li>Multiply and divide fractions including improper fractions and mixed numbers</li> <li>Perform and describe reflections in horizontal, vertical and diagonal lines. Describe rotational symmetry.</li> </ul>                         |
| <b>Lent 1</b>   | <b>Area, volume and density / Equations and inequalities / Percentages</b>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Lent 2</b>   | <b>Indices / Standard form / Interpret and represent data</b>                                                                                                                                                                                                                                                                                                                                                           |
| Description     | <ul style="list-style-type: none"> <li>Find the area and volume of shapes including prisms. Convert between metrics units of length, mass and capacity. Calculate and solve problems with density, mass and volume.</li> <li>Solve equations and inequalities including with unknowns on both sides and show on a number line.</li> <li>Calculate percentage increase and decrease using multipliers. Express one number as a percentage of another.</li> </ul>                                                   | Description     | <ul style="list-style-type: none"> <li>Add, subtract, multiply and divide with indices. Explore powers of powers, negative and fractional indices.</li> <li>Write small and big numbers in standard form and input and interpret on a calculator.</li> <li>Choose the most appropriate average and compare distributions using average and range. Interpret and find averages from grouped frequency tables.</li> </ul> |

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| <b>Pentecost 1</b> | Angles in Parallel Lines & Polygons / Tables and probability                                                                                                                                                                                                                                                                      | <b>Pentecost 2</b> | Circles / Graphs and charts / Sequences                                                                                                                                                                                                                                                                                                                                                                                        |
| Description        | <ul style="list-style-type: none"> <li>Understand how to solve problems with angles in parallel lines &amp; polygons. Know properties of special quadrilaterals and calculate exterior angles.</li> <li>Calculate probabilities of singles events and from experiments using sample space diagrams and two-way tables.</li> </ul> | Description        | <ul style="list-style-type: none"> <li>Calculate the area and circumference of circles and part circles</li> <li>Use the data handling cycle to draw and interpret bar charts, line graphs &amp; pie charts along with calculating averages, comparing distributions and identifying misleading diagrams.</li> <li>Generate and describe sequences from simple and more complex algebraic rules. Find the nth term.</li> </ul> |

# 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                                                                                                                                                                                                                                                                                                       |
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| Description | <ul style="list-style-type: none"><li>• Draw straight line graphs, write the equation of a straight line and understand lines that are parallel and perpendicular</li><li>• Solve equations and inequalities, including those with unknowns on both sides, while also being able to rearrange formulae</li></ul> | Description | <ul style="list-style-type: none"><li>• Test conjectures to prove whether they are always, sometimes or never true</li><li>• Recognise different 3D shapes, drawing nets, plans and elevations and finding the total surface area and volume</li><li>• Draw accurate constructions of loci &amp; bisectors and also recognise congruency with triangles</li></ul> |
| Lent 1      | Number Skills / Reverse and Repeated Percentage Change                                                                                                                                                                                                                                                           | Lent 2      | Maths with Money / Geometric Reasoning / Rotate and Translate Shapes                                                                                                                                                                                                                                                                                              |
| Description | <ul style="list-style-type: none"><li>• Use my number skills to calculate with surds, solve problems in context and recap my skills with fractions and standard form</li><li>• Solve problems with reverse and repeated percentage change</li></ul>                                                              | Description | <ul style="list-style-type: none"><li>• Use maths with money by calculating interest, finding prices with VAT, calculating wages and taxes and solving problems with exchange rates</li><li>• Use skills of deduction to solve problems with angles using geometric reasoning</li><li>• Rotate and translate shapes around lines and coordinate points</li></ul>  |

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| <b>Pentecost 1</b> | Pythagoras' Theorem / Enlarge Shapes and Recognise Similarity / Proportion and Ratio                                                                                                                                                                                                             | <b>Pentecost 2</b> | Compound Measures / Probability / Algebraic Representation                                                                                                                                                                                                                                                                                   |
| Description        | <ul style="list-style-type: none"> <li>• Use Pythagoras' theorem to find missing lengths</li> <li>• Enlarge shapes and recognise similarity, including with fractional and negative scale factors</li> <li>• Solve problems involving direct proportion, inverse proportion and ratio</li> </ul> | Description        | <ul style="list-style-type: none"> <li>• Understand compound measures when looking at rates of flow, speed, density and distance-time graphs</li> <li>• Use tree diagrams to solve problems with probability</li> <li>• Interpret quadratic graphs and those of simultaneous equations which demonstrate algebraic representation</li> </ul> |

# 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    | Algebraic manipulation / Equations, inequalities and formulae / Quadratic expressions and equations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Advent 2    | Percentages / Ratio and scale / Work with fractions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| Description | <ul style="list-style-type: none"> <li>Substitute into an expression, collect like terms, know and apply the index laws, expand a single bracket and factorise.</li> <li>Solve one-step and two-step algebraic equations and inequalities including fractional equations. Change the subject of a simple and known formula. <i>Higher Tier additional content: solve more complex equations and represent inequalities using set notation.</i></li> <li>Expand double brackets and factorise quadratic expressions including by the difference of two squares. Solve quadratic equations equal to 0. <i>Higher Tier additional content: Factorise and solve more complex quadratic equations. Solve by completing the square</i></li> </ul> | Description | <ul style="list-style-type: none"> <li>Calculate percentages of amounts and percentage increase and decrease including repeated percentage change. Express one number as a percentage of another, find an original value and calculate with both simple and compound interest.</li> <li>Share in a ratio (whole given, part given or difference given), link ratios and fractions. Combine a set of ratios and share in a ratio algebraically. <i>Higher Tier additional content: solve problems with ratio and algebra including the use of algebraic fractions</i></li> <li>Calculate fractions of amounts, increase and decrease by a fraction. Use a fraction to find a whole, work with equivalent and mixed numbers. Add, subtract, multiply and divide with fractions and relate to problem solving questions. <i>Higher Tier additional content: Add and subtract more complex algebraic fractions.</i></li> </ul> |

| Lent 1      | Non-calculator methods / Straight line graphs / Probability / Rounding and estimation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Lent 2      | Perimeter, area and volume / Interpret and represent data / Non-linear graphs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| Description | <ul style="list-style-type: none"> <li>Place value, compare and order numbers, four operations with decimals and directed number, order of operations and related calculations. Solve multi-step problems. <i>Higher Tier additional content: convert recurring decimals to fractions.</i></li> <li>Draw straight line graphs and use to solve equations. Find the equation of a line from a graph. Find the mid-point of a segment. Find the equation of a straight line given one point and the gradient and also when given two points. <i>Higher Tier additional content: represent solution to multiple inequalities on a graph.</i></li> <li>Calculate probabilities, list outcomes. Understand and find relative frequency, complete sample space diagrams, two-way tables and frequency trees. Calculate probabilities for independent events. <i>Higher Tier additional content: Complete and interpret tree diagrams for independent events</i></li> <li>Round to decimal places and significant figures and estimate answers to calculations. Use a calculator effectively. Write error intervals (including truncation) and find upper and lower bounds. <i>Higher tier additional content: Find and calculate with upper and lower bounds.</i></li> </ul> | Description | <ul style="list-style-type: none"> <li>Find the perimeter and area of 2-D shapes including compound shapes. Recognise and label the parts of a circle. Find the area and circumference of a circle and the volume and surface area of a prism. <i>Higher Tier additional content: Find arc length and the perimeter of a sector. Find the area of a sector. Find the volume of a cylinder.</i></li> <li>Calculate averages and range and find averages from frequency tables. Use data to compare distributions. Draw and estimate data values using a scatter graph. <i>Higher Tier additional content: explore and know the terms interpolation and extrapolation.</i></li> <li>Be able to draw and interpret quadratic graphs including recognising intercepts and roots. Be able to plot a cubic graph and approximate solutions to equations using graphs. <i>Higher tier additional content: estimate the area under a curve, recognise and find the area of a circle. Find the equation of a tangent to a circle.</i></li> </ul> |

| Pentecost 1 | Angles / Graphs and diagrams / Vectors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Pentecost 2 | Factors, powers and surds / Pythagoras' Theorem and trigonometry / Simultaneous equations                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description | <ul style="list-style-type: none"> <li>• Calculate with angle facts. Find the interior and exterior angles of polygons and solve related problems. Calculate with alternate, corresponding and co-interior angles. <i>Higher Tier additional content: prove geometric facts.</i></li> <li>• Draw and interpret pictograms, dual and composite bar charts, pie charts, time series graphs and frequency polygons. <i>Higher Tier additional content: draw and interpret histograms and cumulative frequency diagrams</i></li> <li>• Understand and represent vectors and use vector notation. Multiply by a scalar, add and subtract and solve problems with vectors. <i>Higher Tier additional content: Explore vector journeys in shapes and quadrilaterals. Recognise and show that vectors are parallel to each other.</i></li> </ul> | Description | <ul style="list-style-type: none"> <li>• Calculate with factors, multiples and primes. Find the prime factorisation of a number and the highest common factor (HCF) and lowest common multiple (LCM) of a pair of numbers. Recognise square and cube numbers, powers and roots. Recognise rational and irrational numbers, including surds. Simplify expressions with surds. <i>Higher Tier additional content: Expand single and double brackets with surds and rationalise the denominator Understand and use fractional and negative indices.</i></li> <li>• Understand and use Pythagoras' Theorem to find missing lengths. Use the tangent, sine and cosine ratio to calculate missing lengths and angles. Work with exact trig values. <i>Higher Tier additional content: Trigonometry in 3D shapes, use the sine and cosine rule to find missing lengths and angles and solve problems.</i></li> <li>• Solve simultaneous equations using graphs, elimination and by substitution. Form and solve simultaneous equations. <i>Higher Tier additional content: Solve simultaneously with one linear and one non-linear, solve by equating coefficients.</i></li> </ul> |

# Maths

## Year 11

### Curriculum Outline

#### Link to Catholic Social Teaching:

Factorising takes a complex, disconnected sum and breaks it into unified, harmonious factors. This perfectly mirrors the CST principle of Solidarity – recognising that seemingly separate individuals and communities are stronger and more complete when brought together in unity.

Changing the subject of a formula is about empowerment and participation. It gives the learner the active ability to look at a relationship from a different perspective and use it to solve new problems. It reflects the catholic belief that individuals have the right and duty to engage, adapt, and shape a more just society using the tools they are given.

| Advent 1    | Straight Line Graph / Non-Linear Graphs / Graphs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Advent 2    | Expand and Factorise Equations / Subject Change of Formulae and Form / Multiplicative Reasoning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| Description | <ul style="list-style-type: none"> <li>Plot <b>straight line graphs</b>, identify gradients and intercepts of lines in the equation of the form <math>y=mx + c</math>, 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.</li> <li>Plot and read from <b>non-linear graphs</b> 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.</li> <li>Use <b>graphs</b> 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.</li> </ul> | Description | <ul style="list-style-type: none"> <li><b>Expand and factorise equations</b>, including single brackets &amp; 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.</li> <li><b>Change the subject of formulae</b> 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.</li> <li>Use <b>multiplicative reasoning</b> to understand direct &amp; inverse proportion, calculate with pressure &amp; density &amp; solve ratio problems. If I am studying higher tier I will also be able to construct complex direct and inverse proportion equations.</li> </ul> |

| Lent 1      | Geometric Reasoning / Algebraic Reasoning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Lent 2      | Transformations and Constructions / Probability of Diagrams                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description | <ul style="list-style-type: none"> <li>Use <b>geometric reasoning</b> 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.</li> <li>Use <b>algebraic reasoning</b> 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.</li> </ul> | Description | <ul style="list-style-type: none"> <li>Use <b>transformations and constructions</b> 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.</li> <li><b>List and describe</b> using probability, including Venn diagrams and sample space diagrams. Draw plans and elevations and interpret scatter graphs.</li> </ul> |
| Pentecost 1 | Revision & Exams                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Pentecost 2 | Revision & Exams                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Description | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Description | /                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |