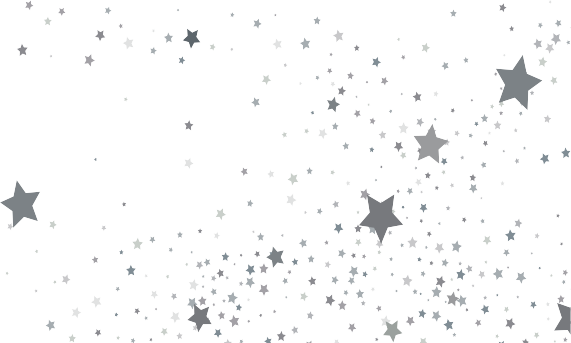
***Section***

***4***

Planning

**1**



The Junior Cycle Maths specification sets out a course of learning that is spread across a Unifying strand and four contextual strands:

**Introduction to planning**

* Number
* Geometry and trigonometry
* Algebra and functions
* Statistics and probability.

Across these strands, there are Learning Outcomes indicating the learning and skills that students should have acquired over the course of their Junior Cycle Maths journey. The specification allows teachers the flexibility to plan based on their own school context and, above all, the needs of their students. *Level Up 1* presents a comprehensive and clear pathway to engage fully with the Ordinary Level Junior Cycle Maths course.

*Level Up 1* has been designed to reflect the spiral and development approach of the specification, mixing Learning Outcomes across the strands to enhance student understanding.

A spiral specification is not simply the repetition of a topic taught across the three years of Junior Cycle; it also requires the deepening of it, with each experience building on the previous one, so that the topics evolve with the maturity of the students. A spiral approach encourages the reinforcement of previously learned concepts, which promotes the retention of skills and bridges old information with the new. There is also an opportunity to revisit elements of topics within the spiral approach.

Throughout the three years, *Level Up 1* will fully engage with the Ordinary Level Learning Outcomes and address the Junior Cycle Key Skills and statements of learning linked to Maths.

The suggested planning material in this section presents a logical progression through the specification. You can, of course, adapt and edit the plans to best suit your school’s particular needs and, more importantly, your students’ needs. *Level Up 1* and the accompanying plans are designed to be completed within the prescribed 240 hours for Junior Cycle Maths.

Editable and blank templates are available online at: [**www.educateplus.ie**](http://www.educateplus.ie/)

There are also blank planning templates available in this Teacher’s Resource Book. In this section, you will find:

* guidance on how to unpack Learning Outcomes
* a scheme of work for Ordinary Level Junior Cycle Maths
* departmental units of learning plans
* blank planning templates.

***Level Up 1*** – Teacher’s Resource Book

**2**

A Learning Outcome is a statement of what a student should understand or be able to do by the end of three years of study. In order to bring students to that point, teachers must use parts of

**Unpacking Learning Outcomes**

Learning Outcomes or entire Learning Outcomes to build units of learning and then share the learning intentions with students. It is important to realise that you do not have to engage with a Learning Outcome in full each time you deal with it. You may deal with some elements of a Learning Outcome at a certain stage of the Junior Cycle journey and deal with other elements of the Learning Outcome at a later stage.

When reading a Learning Outcome for the first time, it is important to trust your instincts as a teacher to work out the key concepts within it. More than likely, you will find that what you understand it to mean is broadly similar to what your department colleagues, and indeed most Maths teachers, will understand it to mean. The point of a Learning Outcome-based curriculum specification is not to make the course of study unclear, but to provide flexibility so that subject teachers are not constrained by teaching a set syllabus from a point in time, regardless of new developments within their field.

Dealing with a Learning Outcome is a little like working backwards. You are being given a destination and being asked to plan your route. In this section, we provide you with a map outlining a possible route for Ordinary Level Junior Cycle Maths. Over the following pages we have unpacked the Learning Outcomes and organised them into units of learning corresponding to the chapters in *Level Up 1*.

It is important to remember that the information on each Learning Outcome offered over the following pages represents one interpretation of the course and the suggested key concepts and skills within it. The suggested learning experiences, assessment strategies and so on are not exhaustive or mandatory.

Keep in mind that you may choose your own methods, activities or approaches to tackle this course. Blank templates are included at the end of the section for this reason, and you are encouraged to use *Level Up 1* as a starting point for your own teaching and planning.

If you do choose to come up with your own departmental units of learning plans, some useful strategies include:

* deciding which topics or Learning Outcomes you wish to address in a given term
* planning and matching Learning Outcomes that work well together to form a unit of learning
* choosing how topics or Learning Outcomes will be experienced
* making a plan for ongoing assessment
* ensuring that experiences and activities provide opportunities to activate Key Skills
* highlighting links between topics.

In *Level Up 1*, we have planned and presented a suggested scheme of work and departmental units of learning plans following the process and guidelines outlined above. These are fully developed and ready to use, but you can use the editable templates at [**www.educateplus.ie**](http://www.educateplus.ie/)to make any changes you would like.

Section 4 – Planning

**3**

***Level Up 1* scheme of work: First Year**

Please note that this scheme of work is available at [**www.educateplus.ie**](http://www.educateplus.ie/)as an editable document.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 1:**  Sets 1  **Time period:**  September | Students will:   * identify a set as a well-defined collection of elements * define sets by listing their elements and generating rules that define them * use and understand set notation * represent sets on Venn diagrams * use the union and intersection of sets to solve problems. | * U.4 * N.5a * N.5b * N.5c * N.5d | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| --- | --- | --- | --- | --- |
| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 2:**  Number Sets  **Time period:**  September | Students will:   * identify and use the following number sets: natural numbers, integers and rational numbers * find factors and multiples of numbers * use factors and multiples to solve problems * find highest common factors and lowest common multiples of numbers * identify prime and composite numbers * use prime factorisation to solve problems. | * U.1 * N.1d * N.5c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**4**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 3:** Reading and Writing Numbers  **Time period:** September/ October | Students will:   * read and write natural numbers, integers, decimals and indices * compare and order integers and decimals * understand place value in integers and decimals * round integers and decimals to decimal places and significant figures * write large numbers using scientific notation. | * U.1 * U.6 * N.1cI * N.1e * N.1f | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| --- | --- | --- | --- | --- |
| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 4:** Working with Numbers  **Time period:**  October | Students will:   * use the number line to add and subtract integers * work with four operations: addition, subtraction, multiplication and division * understand the commutative and associative properties * apply the order of operations correctly. | * U.2 * U.12 * N.1a * N.1b * N.1cI * N.1cV | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

Section 4 – Planning

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 5:**  Algebra 1: Reading and Writing Letters  **Time period:** October/ November | Students will:   * read, write and interpret algebraic expressions * evaluate algebraic expressions * simplify algebraic expressions. | * U.4 * U.6 * U.7 * AF.2a * AF.2b * AF.3aI | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 6:**  Algebra 2: Equations and Inequalities  **Time period:**  December | Students will:   * appreciate the difference between equations and expressions * apply inverse operations to solve one- and two- step equations * verify solutions of equations * graphically represent solutions to inequalities * solve one- and two-step inequalities. | * U.4 * U.6 * U.7 * AF.2a * AF.2b * AF.2c * AF.4a * AF.4d | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**6**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 7:** Fractions, Decimals and Percentages  **Time period:**  December | Students will:   * identify fractions of amounts * find equivalent fractions * write fractions in their simplest form * calculate with decimals * write a number as a percentage of another * find a percentage of a number * convert between fractions, decimals and percentages. | * U.3 * U.6 * N.1b * N.1e * N.2a | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 8:**  Probability 1  **Time period:**  January | Students will:   * explore the language of probability * use the probability scale * calculate probability of events happening and not happening * calculate relative and expected frequency * evaluate if trials and experiments are fair or biased. | * U.6 * U.7 * SP.1a * SP.1b * SP.2a * SP.2b | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

Section 4 – Planning

**7**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 9:**  Statistics 1  **Time period:**  January | Students will:   * meet different types of data * classify data into categories * understand how to collect data * decide if data is biased or unbiased * design survey questions * present data in tally and frequency tables. | * U.4 * U.6 * U.13 * SP.3a * SP.3b * SP.3c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 10:** Length, Polygons and Perimeter  **Time period:**  February | Students will:   * learn how to convert between different units of length in the metric system * measure lengths with a ruler to different levels of accuracy * use scaled models to calculate the measurements of real-life objects * calculate the perimeter of regular and irregular polygons * create and solve perimeter equations. | * U.3 * U.6 * U.7 * U.8 * U.9 * GT.1 * GT.2a * GT.2c * AF.2c * AF.4a | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**8**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 11:**  Geometry 1: Lines and Angles  **Time period:**  February/March | Students will:   * learn about points, rays, lines and line segments * construct and divide line segments * measure, construct and bisect angles * solve angle problems using algebra. | * U.3 * GT.3a * GT.3bI * GT.3bII | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 12:**  Geometry 2: Intersecting and Parallel Lines  **Time period:**  March | Students will:   * investigate the properties of vertically opposite angles * identify and use vertically opposite angles to solve problems * identify perpendicular lines * construct perpendicular lines and perpendicular bisectors * identify and construct parallel and transversal lines * identify corresponding and alternate angles * apply the properties of corresponding and alternate angles to solve problems. | * U.4 * U.12 * GT.3a * GT.3bI * GT.3bII * GT.3c * GT.3d * GT.3e | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 13:** Co-ordinate Geometry 1  **Time period:**  March/April | Students will:   * identify and plot points accurately on the co-ordinate plane * record the co-ordinates of points based on their position on the co-ordinate plane * apply the midpoint formula to calculate and interpret the midpoint of a line segment * determine and evaluate the distance between two points on the co-ordinate plane using the distance formula. | * U.4 * U.5 * GT.5a * GT.5b | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 14:** Working with Fractions  **Time period:**  April | Students will:   * convert between improper fractions and mixed numbers * add and subtract fractions * multiply and divide fractions * solve problems involving fractions. | * U.1 * U.2 * U.6 * N.1a * N.1b | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**10**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 15:** Ratio and Proportion  **Time period:**  May | Students will:   * use ratio notation to compare two or more quantities * divide amounts into a given ratio * solve problems involving direct proportion. | * U.3 * U.5 * U.6 * U.8 * N.2b * N.3a * N.3b | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**11**

***Level Up 1* scheme of work: Second Year**

Please note that this scheme of work is available at [**www.educateplus.ie**](http://www.educateplus.ie/)as an editable document.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 16:**  Sets 2  **Time period:**  September | Students will:   * revise set notation from Chapter 1 * learn about set difference * learn about the complement of a set * solve word problems involving sets * use Venn diagrams to find probabilities. | * U.4 * U.6 * N.5a * N.5b * N.5c * N.5d * SP.2a * SP.2b | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 17:** Working with Indices (Exponents)  **Time period:** September/ October | Students will:   * apply the laws of indices, including to situations involving multiplication of indices, raising indices to a power and dividing indices * apply the order of operations to problems involving indices * represent fractional indices in surd form. | * U.1 * U.3 * U.5 * N.1cI * N.1cII * N.1cIV * N.1cV | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**12**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 18:** Multiplication and Division  **Time period:**  October | Students will:   * use the array model to multiply and divide numbers and letters * expand and simplify algebra brackets. | * U.2 * U.5 * U.11 * AF.3aII * AF.3bI * AF.3bII * AF.3c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 19:**  Probability 2  **Time period:**  November | Students will:   * use two-way tables and tree diagrams to display sample spaces of experiments or trials * calculate the total number of outcomes from an experiment or trial using the fundamental principle of counting * calculate probability of events happening from diagrams. | * U.1 * U.4 * U.5 * SP.1a * SP.1b * SP.2a * SP.2b * SP.2c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**13**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 20:**  Statistics 2  **Time period:** November/ December | Students will:   * represent data using a variety of charts: line plot, bar chart, stem and leaf diagrams, pie charts and histograms * interpret data from a variety of representations. | * U.4 * U.5 * SP.3d * SP.3f | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 21:**  Algebra 3: Equations and Word Problems  **Time period:**  December | Students will:   * solve equations with unknowns on both sides of the equation * solve equations involving brackets * add and subtract algebraic fractions * solve equations involving fractions * solve word problems using algebra. | * U.2 * U.3 * U.7 * U.8 * AF.2c * AF.4a * AF.4d | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 22:** Co-ordinate Geometry 2  **Time period:**  January | Students will:   * investigate geometric transformations * find and interpret the slope of a line * find and interpret the equation of a line. | * U.4 * U.5 * GT.5a * GT.5b * GT.5c * GT.6a | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 23:**  Algebra 4: Simultaneous Equations  **Time period:**  February | Students will:   * use substitution to solve simultaneous equations * apply the elimination method to solve simultaneous equations * draw graphs for two equations and find where they meet (point of intersection) * use the intersection of two graphs to solve simultaneous equations visually. | * U.2 * U.3 * U.4 * U.8 * U.9 * U.10 * GT.5a * GT.5b * AF.4c * AF.7b * AF.7c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

**CBA 1: Mathematical investigation** will take place in a three-week period in the second term of Second Year. This is scheduled for February/March in this sample scheme of work.

Section 4 – Planning

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 24:**  Geometry 3: Triangles  **Time period:**  March | Students will:   * learn about the interior and exterior angles of a triangle * construct triangles given three pieces of information * identify congruent triangles * solve problems involving similar triangles. | * U.4 * U.5 * U.11 * U.12 * U.13 * GT.3a * GT3.bII * GT.3d * GT.3e | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 25:**  Geometry 4: Right-Angled Triangles  **Time period:**  March/April | Students will:   * construct right-angled triangles * use the Pythagorean theorem to find missing side lengths of right-angled triangles * solve real-world problems with the Pythagorean theorem * examine the properties of cyclic right-angled triangles. | * U.5 * U.13 * GT.3a * GT.3bII * GT.3bIII * GT.3c * GT.3d * GT.3e | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 26:**  Area, Surface Area and Volume  **Time period:**  April/May | Students will:   * find the area of different shapes * find the surface area of cuboids * find the volume of cuboids. | * U.4 * U.5 * U.6 * U.8 * U.9 * GT.2a * GT.2b * GT.2c * GT.2d * GT.2e | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**17**

***Level Up 1* scheme of work: Third Year**

Please note that this scheme of work is available at [**www.educateplus.ie**](http://www.educateplus.ie/)as an editable document.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 27:**  Statistics 3  **Time period:**  September | Students will:   * learn how to calculate the mode, median and mean averages of data sets * choose, calculate and interpret appropriate averages to summarise data. | * U.5 * U.6 * U.9 * U.10 * U.13 * SP.3e * SP.3g * SP.3h | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 28:**  Patterns  **Time period:**  September | Students will:   * investigate visual patterns * examine number sequences and identify term-to-term rules * use the general/*n*th term to identify terms in linear sequences * decide if sequences are linear or non-linear * graph linear sequences. | * U.4 * U.8 * AF.1a * AF.1b * AF.1c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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**18**

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 29:**  Financial Maths  **Time period:**  October | Students will:   * solve financial maths problems involving percentages * work with VAT and profit and loss percentages * calculate income after income tax has been deducted * interpret household bills and calculate total amounts owed on them * calculate interest on loans and savings * convert money into different currencies. | * U.4 * U.6 * U.8 * U.9 * N.2b * N.2c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 30:** Circles and Cylinders  **Time period:** October/ November | Students will:   * label the different parts of a circle * calculate the perimeter of circles, semicircles and composite shapes using pi * calculate the area of circles, semicircles and composite shapes using pi * calculate the volume of cylinders. | * U.4 * U.8 * GT.2c * GT.2d | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 31:**  Geometry 5: Quadrilaterals and Symmetry  **Time period:**  November | Students will:   * work with angles in quadrilaterals * recall the properties of angles, sides and diagonals in parallelograms * solve problems involving angles and sides in parallelograms * construct rectangles * identify and draw axes of symmetry. | * U.4 * U.5 * U.8 * U.11 * U.12 * U.13 * GT.3a * GT.3bII * GT.3e * GT.6b | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 32:**  Functions  **Time period:**  December | Students will:   * define what a function is * investigate functions using mapping diagrams * learn to read and write function notation * graph functions using inputs and output tables * use your understanding of graphs to solve problems. | * U.3 * U.4 * U.5 * N.4 * AF.4a * AF.7a * AF.7b * AF.7d | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

***Level Up 1*** – Teacher’s Resource Book

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 33:** Real-Life Problems: Distance, Time,  Speed and Graphs  **Time period:**  December | Students will:   * work with units of time and read timetables * solve real-life problems involving distance, speed and time * read and interpret distance–time graphs, direct proportion graphs and quadratic graphs. | * U.4 * U.5 * U.6 * U.8 * U.10 * N.3a * N.3b * N.4 * GT.1 * AF.1a * AF.1b * AF.2c * AF.7b | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 34:**  Trigonometry  **Time period:**  January | Students will:   * label right-angled triangles * learn about trigonometric ratios: sin, cos and tan * use trigonometric ratios to find missing sides * find missing angles using trigonometric ratios * solve real-world trigonometry problems. | * U.2 * U.3 * U.6 * U.9 * U.10 * GT.4 | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

**CBA 2: Statistical investigation** will take place in a three-week period in the second term of Third Year. This is scheduled for March in this sample scheme of work.

Section 4 – Planning

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter 35:**  Algebra 5: Factorising and Solving Equations  **Time period:**  March/April | Students will:   * identify the highest common factor between terms * factorise linear and quadratic expressions * use factorising to solve quadratic equations * connect quadratic solutions to features on a quadratic graph. | * U.3 * U.4 * U.10 * U.13 * AF.3aII * AF.3dI * AF.3dII * AF.3dIII * AF.3dIV * AF.3dV * AF.4b * AF.7c | * Being literate * Managing myself * Staying well * Managing information and thinking * Being numerate * Being creative * Working with others * Communicating | * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions |

**Revision and exam preparation:** April/May

**Departmental units of learning plans**

Please note that all the departmental units of learning plans are available at [**www.educateplus.ie**](http://www.educateplus.ie/)as editable documents.

**Chapter 1: Sets 1**

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| **Year group:** First Year | **Time period:** September | |
| **Prior knowledge:**  Primary Mathematics Curriculum | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **N.5:** explore the concept of a set so that they can:   1. understand the concept of a set as a well-defined collection of elements, and that set equality is a relationship where two sets have the same elements 2. define sets by listing their elements, if finite (including in a 2-set or **~~3-set~~** Venn diagram), or by generating rules that define them 3. use and understand suitable set notation and terminology, including null set, ∅, subset, ⊂, complement, element, ∈, universal set, cardinal number, #, intersection, ∩, union, ∪, set difference, \ , ℕ, ℤ, ℚ, ℝ and ℝ\ℚ 4. perform the operations of intersection and union on 2 sets   **~~and on 3 sets~~**, set difference and complement, including the use of brackets to define the order of operations | |
| **Key learning:**  Students will:   * identify a set as a well- defined collection of elements * define sets by listing their elements and generating rules that define them * use and understand set notation * represent sets on Venn diagrams * use the union and intersection of sets to solve problems. |
| **Learning experiences:**   * Identifying valid sets versus non-sets * Doing a quick quiz on membership symbols * Drawing and interpreting Venn diagrams * Working with equal sets and subsets * Matching set notations to explanations * Completing Venn diagram tasks with *U*, *A* ∪ *B*, *A* ∩ *B* | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 2: Number Sets**

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| **Year group:** First Year | **Time period:** September | |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 1: Sets 1 | **Learning Outcomes:**  **U.1:** recall and demonstrate understanding of the fundamental concepts and procedures that underpin each strand  **N.1:** investigate the representation of numbers and arithmetic operations so that they can:  **d.** calculate and interpret factors (including the highest common factor), multiples (including the lowest common multiple) and prime numbers  **N.5:** explore the concept of a set so that they can:  **c.** use and understand suitable set notation and terminology, including null set, Ø, subset, ⊂, complement, element, ∈, universal set, cardinal number, #, intersection, ∩, union, ∪, set difference, \ , ℕ, ℤ, ℚ, ℝ and ℝ\ℚ | |
| **Key learning:**  Students will:   * identify and use the following number sets: natural numbers, integers and rational numbers * find factors and multiples of numbers * use factors and multiples to solve problems * find highest common factors and lowest common multiples of numbers * identify prime and composite numbers * use prime factorisation to solve problems. |
| **Learning experiences:**   * Classifying numbers * Using Venn diagrams to examine the relationships between number sets * Working with HCF and LCM * Working through HCF and LCM word problems * Exploring prime versus composite numbers * Using the Sieve of Eratosthenes * Using Venn diagrams to solve HCF and LCM problems * Building factor trees * Solving HCF and LCM problems using prime factorisation | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 3: Reading and Writing Numbers**

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| **Year group:** First Year | **Time period:** September/October |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 2: Number Sets | **Learning Outcomes:**  **U.1:** recall and demonstrate understanding of the fundamental concepts and procedures that underpin each strand  **U.6:** make connections between mathematics and the real world  **N.1:** investigate the representation of numbers and arithmetic operations so that they can:  **c.** explore numbers written as 𝑎​𝑏 (in index form) so that they can:  **I.** flexibly translate between whole numbers and index representation of numbers   1. present numerical answers to the degree of accuracy specified, for example, correct to the nearest hundred, to two decimal places, or to three significant figures 2. convert the number 𝑝​ in decimal form to the form 𝑎​ × 10​𝑛, where 1 ≤ 𝑎​ < 10, 𝑛 ∈ ℤ, 𝑝​ ∈ ℚ and 𝑝​ ≥ 1 **~~and 0~~** ~~< 𝑝​ <~~ **~~1~~** |
| **Key learning:**  Students will:   * read and write natural numbers, integers, decimals and indices * compare and order integers and decimals * understand place value in integers and decimals * round integers and decimals to decimal places and significant figures * write large numbers using scientific notation. |
| **Learning experiences:**   * Reading positive and negative integers • Solving real-life rounding problems * Ordering integers using number lines • Rounding to 1–3 significant figures * Comparing integers using < and > • Understanding significance in real-life numbers * Exploring place value for large numbers • Identifying significant figures * Writing numbers in digits and words • Understanding and using index notation * Rounding to nearest 10, 100, 1 000 and 10 000 • Exploring square and cube numbers * Performing estimations with whole numbers • Performing index-to-expanded conversions * Reading, writing and comparing decimal • Converting to and from scientific notation numbers • Combining scientific notation with significant * Ordering decimals figures * Rounding decimals to 1, 2 and 3 decimal places • Writing large numbers in scientific notation * Performing estimations using decimal rounding • Solving real-world problems | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | |

**Chapter 4: Working with Numbers**

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| **Year group:** First Year | **Time period:** October | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 2: Number Sets;  Chapter 3: Reading and  Writing Numbers | **Learning Outcomes:**  **U.2:** apply the procedures associated with each strand accurately, effectively and appropriately  **U.12:** generate and evaluate mathematical arguments and proofs  **N.1:** investigate the representation of numbers and arithmetic operations so that they can:   1. represent the operations of addition, subtraction, multiplication and division in ℕ, ℤ and ℚ using models including the number line, decomposition, and accumulating groups of equal size 2. perform the operations of addition, subtraction, multiplication and division and understand the relationship between these operations and the properties: commutative, associative and distributive in ℕ, ℤ and ℚ **~~and in~~** ~~ℝ~~**~~\~~**~~ℚ~~**~~, including operating~~  ~~on surds~~** 3. explore numbers written as 𝑎​𝑏 (in index form) so that they can:    1. flexibly translate between whole numbers and index representation of numbers   **V.** correctly use the order of arithmetic and index operations including the use of brackets | |
| **Key learning:**  Students will:   * use the number line to add and subtract integers * work with four operations: addition, subtraction, multiplication and division * understand the commutative and associative properties * apply the order of operations correctly. |
| **Learning experiences:**   * Adding and subtracting using number lines * Adding and subtracting negative numbers * Using number lines to visualise operations * Discussing inverse relationships * Exploring the rules for signs in multiplication and division * Multiplying and dividing using number lines * Exploring the commutative and associative properties * Identifying properties in different operations * Exploring square root as an inverse operation * Calculating squares and roots * Applying the order of operations (GEMS) to short expressions and more complex expressions * Solving complex GEMS problems | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 5: Algebra 1: Reading and Writing Letters**

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| **Year group:** First Year | **Time period:** October/November | |
| **Prior knowledge:** Primary Mathematics Curriculum | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.6:** make connections between mathematics and the real world  **U.7:** make sense of a given problem, and if necessary mathematise a situation  **AF.2:** investigate situations in which letters stand for quantities that are variable so that they can:   1. generate and interpret expressions in which letters stand for numbers 2. find the value of expressions given the value of the variables   **AF.3:** apply the properties of arithmetic operations and factorisation to generate equivalent expressions so that they can develop and use appropriate strategies to:   1. add, subtract and simplify   **I.** linear expressions in one or more variables with coefficients in ℚ | |
| **Key learning:**  Students will:   * read, write and interpret algebraic expressions * evaluate algebraic expressions * simplify algebraic expressions. |
| **Learning experiences:**   * Identifying terms, coefficients, constants and variables in algebraic expressions * Using algebra tiles to visualise expressions and break down terms * Exploring variables in real-life contexts * Converting verbal descriptions to algebraic expressions * Exploring multiplication and division using variables * Translating phrases like ‘add 2, then multiply by 3’ into algebra * Interpreting and constructing more detailed expressions * Substituting values into algebraic expressions * Evaluating using the correct order of operations * Solving substitution problems * Substituting into expressions with more than one variable * Using brackets consistently * Evaluating expressions with two variables * Grouping like terms * Simplifying basic and advanced expressions * Identifying expressions that can/cannot be simplified | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 6: Algebra 2: Equations and Inequalities**

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| **Year group:** First Year | **Time period:** December | |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 2: Number Sets; Chapter 5: Algebra 1: Reading and Writing Letters | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.6:** make connections between mathematics and the real world  **U.7:** make sense of a given problem, and if necessary mathematise a situation  **AF.2:** investigate situations in which letters stand for quantities that are variable so that they can:   1. generate and interpret expressions in which letters stand for numbers 2. find the value of expressions given the value of the variables 3. use the concept of equality to generate and interpret equations   **AF.4:** select and use suitable strategies (graphic, numeric, algebraic, trial and improvement, working backwards) for finding solutions to:   1. linear equations in one variable with coefficients in ℚ and solutions in ℤ **~~or in~~** ~~ℚ~~   **d.** linear inequalities in one variable of the form 𝑔(𝑥​) < 𝑘, and graph the solution sets on the number line for 𝑥​ ∈ ℕ, ℤ and ℝ | |
| **Key learning:**  Students will:   * appreciate the difference between equations and expressions * apply inverse operations to solve one- and two-step equations * verify solutions of equations * graphically represent solutions to inequalities * solve one- and two-step inequalities. |
| **Learning experiences:**   * Exploring the difference between expressions • Representing solutions visually using number and equations lines * Visualising balance using equations • Matching inequality symbols to meanings * Interpreting and verifying simple equations • Graphing simple inequalities * Applying inverse operations in the correct • Interpreting and describing inequalities using order real-life examples * Solving and verifying more complex equations • Solving inequalities like equations * Working through equations with both addition/ • Reversing the sign when multiplying/dividing subtraction and multiplication/division by a negative * Exploring the difference between equations and • Solving and graphing a variety of one- and inequalities two-step inequalities | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 7: Fractions, Decimals and Percentages**

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| **Year group:** First Year | **Time period:** December | |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 3: Reading and Writing Numbers; Chapter 4: Working with Numbers | **Learning Outcomes:**  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.6:** make connections between mathematics and the real world  **N.1:** investigate the representation of numbers and arithmetic operations so that they can:  **b.** perform the operations of addition, subtraction, multiplication and division and understand the relationship between these operations and the properties: commutative, associative and distributive in ℕ, ℤ and ℚ **~~and in~~** ~~ℝ~~**~~\~~**~~ℚ~~**~~, including operating on surds~~**  **e.** present numerical answers to the degree of accuracy specified, for example, correct to the nearest hundred, to two decimal places or to three significant figures  **N.2:** investigate equivalent representations of rational numbers so that they can:  **a.** flexibly convert between fractions, decimals and percentages | |
| **Key learning:**  Students will:   * identify fractions of amounts * find equivalent fractions * write fractions in their simplest form * calculate with decimals * write a number as a percentage of another * find a percentage of a number * convert between fractions, decimals and percentages. |
| **Learning experiences:**   * Understanding and identifying fractions • Identifying types of decimals (terminating, * Working with equivalent and simplified fractions recurring, non-repeating) * Comparing and ordering fractions • Converting between percentages, decimals * Converting and simplifying fractions and fractions * Adding and subtracting decimals • Finding a percentage of a number * Multiplying and dividing with decimals • Expressing one number as a percentage of   (calculator-supported) another   * Estimating and checking answers • Solving word problems involving money, * Engaging with real-life scenarios (e.g. money, scores, measurements   measurements) • Solving problems where percentage is given   * Converting fractions to decimals (manually but base value is unknown   and with calculator) • Comparing values using different forms   * Converting decimals to fractions and simplifying | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 8: Probability 1**

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| **Year group:** First Year | **Time period:** January | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 7: Fractions, Decimals and Percentages | **Learning Outcomes:**  **U.6:** make connections between mathematics and the real world  **U.7:** make sense of a given problem, and if necessary mathematise a situation  **SP.1:** investigate the outcomes of experiments so that they can:   1. generate a sample space for an experiment in a systematic way, including tree diagrams for successive events and two- way tables for independent events 2. use the fundamental principle of counting to solve authentic problems   **SP.2:** investigate random events so that they can:   1. demonstrate understanding that probability is a measure on a scale of 0–1 of how likely an event (including an everyday event) is to occur 2. use the principle that, in the case of equally likely outcomes, the probability of an event is given by the number of outcomes of interest divided by the total number of outcomes | |
| **Key learning:**  Students will:   * explore the language of probability * use the probability scale * calculate probability of events happening and not happening * calculate relative and expected frequency * evaluate if trials and experiments are fair or biased. |
| **Learning experiences:**   * Understanding likelihood words versus • Justifying outcomes using fairness and numerical probability comparison * Sorting statements on the probability scale • Completing Venn diagram tasks * Listing sample spaces for familiar contexts • Understanding experimental probability * Using the probability formula versus theoretical probability * Representing probability in different forms • Calculating relative frequency and expected (fraction, decimal, percentage) outcomes * Solving card, spinner and bag scenarios • Completing frequency tables * Estimating and comparing probabilities • Comparing predictions with real data * Solving multi-step and contextual problems • Conducting simple in-class experiments | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 9: Statistics 1**

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| **Year group:** First Year | **Time period:** January | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 8:  Probability 1 | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.6:** make connections between mathematics and the real world  **U.13:** communicate mathematics effectively: justify their reasoning, interpret their results, explain their conclusions, and use  the language and notation of mathematics to express mathematical ideas precisely  **SP.3:** carry out a statistical investigation which includes the ability to:   1. generate a statistical question 2. plan and implement a method to generate and/or source unbiased, representative data, and present this data in a frequency table 3. classify data (categorical, numerical) | |
| **Key learning:**  Students will:   * meet different types of data * classify data into categories * understand how to collect data * decide if data is biased or unbiased * design survey questions * present data in tally and frequency tables. |
| **Learning experiences:**   * Comparing types of data • Designing mini surveys in groups * Sorting and classifying data • Creating frequency tables * Discussing examples from real life • Representing categorical and discrete * Exploring methods for choosing a fair sample numerical data * Evaluating sample scenarios • Interpreting charts and basic probability * Creating examples of biased and unbiased questions   samples • Collecting class data and building a tally chart   * Examining features of good survey questions • Applying the full data-handling cycle * Avoiding bias in wording • Revisiting initial investigation and improving it * Writing survey questions that generate • Consolidation of types of data, bias and different data types survey design | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 10: Length, Polygons and Perimeter**

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| **Year group:** First Year | **Time period:** February | |
| **Prior knowledge:** Primary Mathematics Curriculum | **Learning Outcomes:**  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.6:** make connections between mathematics and the real world  **U.7:** make sense of a given problem, and if necessary mathematise a situation  **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **U.9:** interpret their solution to a problem in terms of the original question  **GT.1:** calculate, interpret and apply units of measure and time  **GT.2:** investigate 2D shapes and 3D solids so that they can:  **a.** draw and interpret scaled diagrams  **c.** find the perimeter and area of plane figures made from combinations of discs, triangles and rectangles, including relevant operations involving pi  **AF.2:** investigate situations in which letters stand for quantities that are variable so that they can:  **c.** use the concept of equality to generate and interpret equations  **AF.4:** select and use suitable strategies (graphic, numeric, algebraic, trial and improvement, working backwards) for finding solutions to:  **a.** linear equations in one variable with coefficients in ℚ and solutions in ℤ **~~or in~~** ~~ℚ~~ | |
| **Key learning:**  Students will:   * learn how to convert between different units of length in the metric system * measure lengths with a ruler to different levels of accuracy * use scaled models to calculate the measurements of real-life objects * calculate the perimeter of regular and irregular polygons * create and solve perimeter equations. |
| **Learning experiences:**   * Performing metric conversions: mm, cm, m, km • Interpreting scale in word problems * Using rulers and measuring accurately • Calculating and reflecting on scaling errors * Interpreting and applying scale ratios • Classifying and labelling regular and irregular * Calculating real-life distances from models polygons * Understanding percentage error in scale contexts • Discussing composite shape structures * Using calculators for multi-step conversions • Solving real-life perimeter problems * Performing reverse scale calculations (model • Applying formulas to regular polygons from real size) | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 11: Geometry 1: Lines and Angles**

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| **Year group:** First Year | **Time period:** February/March | |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 6: Algebra 2: Equations and Inequalities; Chapter 10: Length, Polygons and Perimeter | **Learning Outcomes:**  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **GT.3:** investigate the concept of proof through their engagement with geometry so that they can:   1. perform constructions 1 to 15 in *Geometry for Post-Primary School Mathematics* **~~(constructions 3 and 7 at HL only)~~** 2. recall and use the concepts, axioms, theorems, corollaries and converses, specified in *Geometry for Post-Primary School Mathematics* (section 9 for OL **~~and section 10 for HL~~**)    1. axioms 1, 2, 3, 4 and 5    2. theorems 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15 **~~and~~**   **~~11, 12, 19~~**, and appropriate converses, including relevant operations involving square roots | |
| **Key learning:**  Students will:   * learn about points, rays, lines and line segments * construct and divide line segments * measure, construct and bisect angles * solve angle problems using algebra. |
| **Learning experiences:**   * Exploring definitions and properties of points, lines, rays and segments * Constructing and measuring line segments * Identifying collinear points * Constructing line segments and dividing line segments into equal parts * Constructing and bisecting/trisecting line segments * Exploring types of angles: acute, obtuse, right, reflex, straight * Naming angles correctly * Using a protractor to measure angles * Recording and comparing angle types * Drawing specific angles using a protractor * Bisecting angles using a compass and a straight edge * Constructing and bisecting various angles * Diagnosing errors in constructions * Using angle facts (right, straight, full turn) in equations * Solving equations involving unknown angles * Combining algebraic methods with geometry | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 12: Geometry 2: Intersecting and Parallel Lines**

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| **Year group:** First Year | **Time period:** March | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 11:  Geometry 1: Lines and Angles | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.12:** generate and evaluate mathematical arguments and proofs  **GT.3:** investigate the concept of proof through their engagement with geometry so that they can:   1. perform constructions 1 to 15 in Geometry for Post-Primary School Mathematics **~~(constructions 3 and 7 at HL only)~~** 2. recall and use the concepts, axioms, theorems, corollaries and converses, specified in *Geometry for Post-Primary School Mathematics* (section 9 for OL **~~and section 10 for HL)~~**    1. axioms 1, 2, 3, 4 and 5    2. theorems 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15 **~~and 11, 12,~~**   **~~19~~**, and appropriate converses, including relevant operations involving square roots   1. use **~~and explain~~** the terms: theorem, proof, axiom, corollary, converse and implies 2. create and evaluate proofs of geometrical propositions 3. display understanding of the proofs of theorems 1, 2, 3, 4,   5, 6, 9, 10, 14, 15, **~~and 13, 19~~**; and of corollaries 3, 4, **~~and~~**  **~~1, 2, 5~~** (full formal proofs are not examinable) | |
| **Key learning:**  Students will:   * investigate the properties of vertically opposite angles * identify and use vertically opposite angles to solve problems * identify perpendicular lines * construct perpendicular lines and perpendicular bisectors * identify and construct parallel and transversal lines * identify corresponding and alternate angles * apply the properties of corresponding and   alternate angles to solve problems. |
| **Learning experiences:**   * Identifying vertically opposite angles • Practising both construction methods (set * Applying the theorem to solve for unknown square and compass)   angles • Recognising corresponding angles with   * Identifying and constructing perpendicular transversals   lines • Applying the theorem and its converse   * Constructing perpendicular bisectors of segments • Solving angle problems using diagrams * Verifying constructions through measurement • Using visual tasks to support theorem reasoning * Defining and recognising parallel lines • Identifying alternate interior and exterior angles * Constructing parallel lines using set square and • Applying the alternate angles theorem compass methods • Using the converse to test for parallel lines * Identifying parallelism using geometric • Sorting and matching alternate angle pairs markings • Applying angle facts in reasoning problems | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 13: Co-ordinate Geometry 1**

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| **Year group:** First Year | **Time period:** March/April |
| **Prior knowledge:**  Primary Mathematics Curriculum;  Chapter 11: Geometry 1: Lines and Angles; Chapter 12: Geometry 2: Intersecting and Parallel Lines | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **GT.5:** investigate properties of points, lines and line segments in the co-ordinate plane so that they can:   1. find and interpret: distance, midpoint, slope, point of intersection, and slopes of parallel **~~and perpendicular~~** lines 2. draw graphs of line segments and interpret such graphs in context, including discussing the rate of change (slope) and the 𝑦-intercept |
| **Key learning:**  Students will:   * identify and plot points accurately on the co-ordinate plane * record the co-ordinates of points based on their position on the co-ordinate plane * apply the midpoint formula to calculate and interpret the midpoint of a line segment * determine and evaluate the distance between two points on the co-ordinate plane using the distance formula. |
| **Learning experiences:**   * Understanding and writing ordered pairs * Plotting points in the first quadrant * Plotting zoo maps and puzzles * Exploring negative co-ordinates and quadrants 2, 3 and 4 * Identifying the location and quadrant of a point * Plotting mixed quadrants * Calculating the midpoint using the average formula * Interpreting the midpoint in real contexts * Constructing midpoints using a compass and a ruler * Using both algebraic and geometric methods * Applying the distance formula * Estimating and calculating distances to 2 decimal places * Using the FIFA method to structure work | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | |

**Chapter 14: Working with Fractions**

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| **Year group:** First Year | **Time period:** April |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 7: Fractions, Decimals and Percentages | **Learning Outcomes:**  **U.1:** recall and demonstrate understanding of the fundamental concepts and procedures that underpin each strand  **U.2:** apply the procedures associated with each strand accurately, effectively and appropriately  **U.6:** make connections between mathematics and the real world  **N.1:** investigate the representation of numbers and arithmetic operations so that they can:   1. represent the operations of addition, subtraction, multiplication and division in ℕ, ℤ and ℚ using models including the number line, decomposition and accumulating groups of equal size 2. perform the operations of addition, subtraction, multiplication and division and understand the relationship between these operations and the properties: commutative, associative and distributive in ℕ, ℤ and ℚ   **~~and in~~** ~~ℝ~~**~~\~~**~~ℚ~~**~~, including operating on surds~~** |
| **Key learning:**  Students will:   * convert between improper fractions and mixed numbers * add and subtract fractions * multiply and divide fractions * solve problems involving fractions. |
| **Learning experiences:**   * Recognising proper, improper and mixed fractions * Converting between improper fractions and mixed numbers * Doing number line work with mixed numbers * Working with fractions with like and unlike denominators * Simplifying results * Adding/subtracting mixed numbers using two methods * Working through structured calculations * Solving multi-step fraction problems * Problem-solving within context (e.g. measurement, money) * Multiplying simple fractions * Simplifying products and interpreting in context * Understanding division through sharing and grouping * Using reciprocals to divide * Performing calculations with and without diagrams | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | |

**Chapter 15: Ratio and Proportion**

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| **Year group:** First Year | **Time period:** May | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 7: Fractions, Decimals and Percentages; Chapter 14: Working with Fractions | **Learning Outcomes:**  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.5:** make connections within and between strands  **U.6:** make connections between mathematics and the real world  **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **N.2:** investigate equivalent representations of rational numbers so that they can:  **b.** use and understand ratio and proportion  **N.3:** investigate situations involving proportionality so that they can:   1. use absolute and relative comparison where appropriate 2. solve problems involving proportionality including those involving currency conversion and those involving average speed, distance and time | |
| **Key learning:**  Students will:   * use ratio notation to compare two or more quantities * divide amounts into a given ratio * solve problems involving direct proportion. |
| **Learning experiences:**   * Writing ratios from diagrams and statements • Reverse-engineering ratios in problem * Simplifying ratios using HCF contexts * Understanding equivalent ratios and real-life • Interpreting ratios in context (e.g. tickets, examples (e.g. aspect ratio, maps) weights, money) * Matching equivalent ratios • Exploring ratio misconceptions * Dividing quantities into a given ratio • Understanding and identifying direct * Using part–whole methods proportion * Solving multi-step ratio sharing problems with • Scaling values up/down using tables two and three parts • Comparing unit rates for better value * Solving word problems using ratio sharing • Exploring real-life examples of proportion in * Working backwards from part of a shared recipes and shopping   amount • Comparing reasoning methods | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 16: Sets 2**

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| **Year group:** Second Year | **Time period:** September | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 1:  Sets 1; Chapter 8:  Probability 1 | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.6:** make connections between mathematics and the real world  **N.5:** explore the concept of a set so that they can:   1. understand the concept of a set as a well-defined collection of elements, and that set equality is a relationship where two sets have the same elements 2. define sets by listing their elements, if finite (including in a 2-set or **~~3-set~~** Venn diagram), or by generating rules that define them 3. use and understand suitable set notation and terminology, including null set, ∅, subset, ⊂, complement, element, ∈, universal set, cardinal number, #, intersection, ∩, union, ∪, set difference, \ , ℕ, ℤ, ℚ, ℝ and ℝ\ℚ 4. perform the operations of intersection and union on 2 sets **~~and~~  ~~on 3 sets~~**, set difference and complement, including the use of brackets to define the order of operations   **SP.2:** investigate random events so that they can:   1. demonstrate understanding that probability is a measure on a scale of 0–1 of how likely an event (including an everyday event) is to occur 2. use the principle that, in the case of equally likely outcomes, the probability of an event is given by the number of outcomes of interest divided by the total number of outcomes | |
| **Key learning:** |
| Students will: |
| * revise set notation from Chapter 1 |
| * learn about set difference |
| * learn about the complement of a set |
| * solve word problems involving sets |
| * use Venn diagrams to find probabilities. |
| **Learning experiences:**   * Revising key symbols: ∈, ∉, ⊂, ∪, ∩, etc. * Using Venn diagrams for unions and intersections * Identifying subsets * Understanding A\B and B\A * Visualising difference using shaded Venn regions | | * Interpreting and completing diagrams * Exploring complement notation: A′, (A ∩ B)′, etc. * Combining set operations * Examining real-life applications of Venn diagrams * Calculating probabilities using cardinal numbers |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 17: Working with Indices (Exponents)**

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| **Year group:** Second Year | **Time period:** September/October | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 3: Reading and Writing Numbers; Chapter 4: Working with Numbers | **Learning Outcomes:**  **U.1:** recall and demonstrate understanding of the fundamental concepts and procedures that underpin each strand  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.5:** Make connections within and between strands  **N.1:** investigate the representation of numbers and arithmetic operations so that they can:  **c.** explore numbers written as 𝑎​𝑏 (in index form) so that they can:   1. flexibly translate between whole numbers and index representation of numbers 2. use and apply generalisations such as 𝑎​𝑝​ 𝑎​𝑞 = 𝑎​𝑝​ +  𝑞; (𝑎​𝑝​)/(𝑎​𝑞) = 𝑎​𝑝​ − 𝑞; (𝑎​𝑝​)𝑞 = 𝑎​𝑝​𝑞; and 𝑛1⁄2 = √𝑛, for 𝑎​ ∈ ℤ, and     𝑝​, 𝑞, 𝑝​ −  𝑞, √𝑛 ∈ ℕ **~~and for~~** 𝒂**,** 𝒃**,** √𝒏 ∈ ℝ, **and** 𝑝​**,** 𝑞 ∈ ℚ   1. generalise numerical relationships involving operations involving numbers written in index form 2. correctly use the order of arithmetic and index operations including the use of brackets | |
| **Key learning:**  Students will:   * apply the laws of indices, including to situations involving multiplication of indices, raising indices to a power and dividing indices * apply the order of operations to problems involving indices * represent fractional indices in surd form. |
| **Learning experiences:**   * Multiplying terms with the same base • Simplifying complex expressions with all three * Writing in index form from expanded form laws * Simplifying numeric and algebraic expressions • Simplifying fraction-based expressions * Raising a power to another power • Combining top and bottom powers * Applying the FIFA method • Converting between index form and surd form * Combining the power and multiplication laws • Recognising and simplifying surds * Simplifying nested powers • Combining use of all index laws * Investigating calculator use (e.g. negative • Problem-solving with large numbers using bases) scientific notation * Dividing terms with the same base • Reasoning with simplification and error- * Subtracting indices checking | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 18: Multiplication and Division**

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| **Year group:** Second Year | **Time period:** October | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 3: Reading and Writing Numbers; Chapter 4: Working with Numbers; Chapter 5: Algebra 1: Reading and Writing Letters; Chapter 6: Algebra 2: Equations and Inequalities | **Learning Outcomes:**  **U.2:** apply the procedures associated with each strand accurately, effectively and appropriately  **U.5:** Make connections within and between strands  **U.11:** generate general mathematical statements or conjectures based on specific instances  **AF.3:** apply the properties of arithmetic operations and factorisation to generate equivalent expressions so that they can develop and use appropriate strategies to:   1. add, subtract and simplify   **II.** quadratic expressions in one variable with coefficients in ℤ   1. multiply expressions of the form    1. 𝑎​(𝑏𝑥​ +  𝑐𝑦 +  𝑑); 𝑎​(𝑏𝑥​2 + 𝑐𝑥​ + 𝑑); and 𝑎​𝑥​(𝑏𝑥​2 + 𝑐𝑥​ + 𝑑), where   𝑎​, 𝑏, 𝑐, 𝑑 ∈ ℤ   * 1. (𝑎​𝑥​ + 𝑏)(𝑐𝑥​ + 𝑑) **and (**𝒂𝒙 **+** 𝒃**)(**𝒄𝒙2 **+** 𝒅𝒙 **+** 𝒆**),** where 𝑎​, 𝑏, 𝑐, 𝑑,   𝑒 ∈ ℤ   1. divide quadratic **~~and cubic expressions~~** by linear expressions, where all coefficients are integers and there is no remainder | |
| **Key learning:**  Students will:   * use the array model to multiply and divide numbers and letters * expand and simplify algebra brackets. |
| **Learning experiences:**   * Exploring the properties of multiplication: associative, commutative, distributive * Using the array model to decompose and multiply numbers * Multiplying letters and expressions * Expanding brackets using the distributive property * Using array and distributive methods to expand binomials * Combining like terms * Using the decomposition method for division * Using the inverse of multiplication with arrays * Dividing expressions by monomials and binomials * Interpreting algebraic array models * Using array models to divide trinomials by binomials * Interpreting factored and expanded forms | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 19: Probability 2**

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| **Year group:** Second Year | **Time period:** November | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 8:  Probability 1 | **Learning Outcomes:**  **U.1:** recall and demonstrate understanding of the fundamental concepts and procedures that underpin each strand  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **SP.1:** investigate the outcomes of experiments so that they can:   1. generate a sample space for an experiment in a systematic way, including tree diagrams for successive events and two-way tables for independent events 2. use the fundamental principle of counting to solve authentic problems   **SP.2:** investigate random events so that they can:   1. demonstrate understanding that probability is a measure on a scale of 0–1 of how likely an event (including an everyday event) is to occur 2. use the principle that, in the case of equally likely outcomes, the probability of an event is given by the number of outcomes of interest divided by the total number of outcomes 3. use relative frequency as an estimate of the probability of an event, given experimental data, and recognise that increasing the number of times an experiment is repeated generally leads to progressively better estimates of its theoretical probability | |
| **Key learning:** |
| Students will: |
| * use two-way tables and tree   diagrams to display sample spaces of  experiments or trials |
| * calculate the total number of outcomes from an experiment or trial using the fundamental principle of counting |
| * calculate probability of events happening from diagrams. |
| **Learning experiences:**   * Displaying all outcomes using sample space diagrams * Constructing and interpreting two-way tables * Counting total outcomes * Constructing and using tree diagrams * Listing outcomes and counting them * Applying the diagrams to real-world contexts | | * Understanding and applying 𝑛 × 𝑚 = total outcomes * Solving multi-stage counting problems * Calculating probabilities using two-way tables and tree diagrams * Interpreting structured visual information * Reasoning and justification in probability * Solving real-life and exam-style problems |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 20: Statistics 2**

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| **Year group:** Second Year | **Time period:** November/December |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 9: Statistics 1; Chapter 11: Geometry 1: Lines and Angles; Chapter 14: Working with Fractions; Chapter 19: Probability 2 | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **SP.3:** carry out a statistical investigation which includes the ability to:  **d.** select, draw and interpret appropriate graphical displays of univariate data, including pie charts, bar charts, line plots, histograms (equal intervals), ordered stem and leaf plots, **~~and ordered back-to-~~ ~~back stem and leaf plots~~**  **f.** evaluate the effectiveness of different graphical displays in representing data |
| **Key learning:**  Students will:   * represent data using a variety of charts: line plot, bar chart, stem and leaf diagrams, pie charts and histograms * interpret data from a variety of representations. |
| **Learning experiences:**   * Constructing and interpreting line plots and bar charts * Comparing chart types * Constructing stem and leaf plots * Interpreting mode, range and ordering * Creating keys and comparing distributions * Working with raw data and completing stem and leaf plots * Using fractions and percentages to find angles * Drawing pie charts with a compass and a protractor * Reading pie charts for comparison and estimation * Solving reverse problems from pie charts * Using total frequency and percentages * Estimating missing values * Drawing and interpreting histograms * Distinguishing histograms from bar charts * Using data sets to build histograms | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | |

**Chapter 21: Algebra 3: Equations and Word Problems**

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| **Year group:** Second Year | **Time period:** December | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 5: Algebra 1: Reading and  Writing Letters; Chapter 6: Algebra 2: Equations and  Inequalities | **Learning Outcomes:**  **U.2:** apply the procedures associated with each strand accurately, effectively and appropriately  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.7:** make sense of a given problem, and if necessary mathematise a situation  **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **AF.2:** investigate situations in which letters stand for quantities that are variable so that they can:  **c.** use the concept of equality to generate and interpret equations  **AF.4:** select and use suitable strategies (graphic, numeric, algebraic, trial and improvement, working backwards) for finding solutions to:  **a.** linear equations in one variable with coefficients in ℚ and solutions in ℤ **~~or in~~** ~~ℚ~~  **d.** linear inequalities in one variable of the form 𝑔(𝑥​) < 𝑘, and graph the solution sets on the number line for 𝑥​ ∈ ℕ, ℤ and ℝ | |
| **Key learning:**  Students will:   * solve equations with unknowns on both sides of the equation * solve equations involving brackets * add and subtract algebraic fractions * solve equations involving fractions * solve word problems using algebra. |
| **Learning experiences:**   * Solving linear equations with variables on both sides * Following logical steps and the order of operations * Step-by-step solving and error-checking * Expanding brackets in equations * Combining like terms before solving * Practising expand → simplify → solve * Working with linear equations with fractional terms * Adding and subtracting algebraic fractions * Combining and solving equations with algebraic fractions * Writing expressions as a single fraction * Solving real-world problems using algebra | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 22: Co-ordinate Geometry 2**

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| **Year group:** Second Year | **Time period:** January | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 13:  Co-ordinate Geometry 1 | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **GT.5:** investigate properties of points, lines and line segments in the co-ordinate plane so that they can:   1. find and interpret: distance, midpoint, slope, point of intersection, and slopes of parallel **~~and perpendicular~~** lines 2. draw graphs of line segments and interpret such graphs in context, including discussing the rate of change (slope) and the   𝑦-intercept | |
| **Key learning:**  Students will:   * investigate geometric transformations * find and interpret the slope of a line * find and interpret the equation of a line. |
|  | **c.** find and interpret the equation of a line in the form 𝑦 = 𝑚𝑥​ +  𝑐;  𝑦 −  𝑦1 = 𝑚(𝑥​ −  𝑥​1); **~~and~~** 𝒂𝒙 +  𝒃𝒚 +  𝒄 ~~= 0​~~ (for 𝑎​, 𝑏, 𝑐, 𝑚, 𝑥​1, 𝑦1  ∈ ℚ); including finding the slope, the 𝑦-intercept and other points  on the line | |
|  | **GT.6:** investigate transformations of simple objects so that they can: | |
|  | **a.** recognise and draw the image of points and objects under translation, central symmetry, axial symmetry and rotation | |
| **Learning experiences:**   * Identifying and performing transformations * Matching shapes with transformations * Describing and performing compound transformations * Understanding slope (positive, negative, zero, undefined) * Using the slope formula with co-ordinates * Identifying a slope from graphs * Identifying steepness and comparing slopes * Understanding slope–intercept form * Identifying the slope and 𝑦-intercept from equations * Writing the equation of parallel lines * Using the formula 𝑦 −  𝑦1 = 𝑚(𝑥​ −  𝑥​1) * Rearranging to slope–intercept form | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 23: Algebra 4: Simultaneous Equations**

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| **Year group:** Second Year | **Time period:** February |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 5: Algebra 1: Reading and  Writing Letters; Chapter 6: Algebra 2: Equations and Inequalities; Chapter 21: Algebra 3: Equations and Word Problems; Chapter 22:  Co-ordinate Geometry 2 | **Learning Outcomes:**  **U.2:** apply the procedures associated with each strand accurately, effectively and appropriately  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations |
| **Key learning:**  Students will:   * use substitution to solve simultaneous equations * apply the elimination method to solve simultaneous equations * draw graphs for two equations and find where they meet (point of intersection) | **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **U.9:** interpret their solution to a problem in terms of the original question  **U.10:** evaluate different possible solutions to a problem, including evaluating the reasonableness of the solutions, and exploring possible improvements and/or limitations of the solutions  (if any)  **GT.5:** investigate properties of points, lines and line segments in the co-ordinate plane so that they can: |
| * use the intersection of two graphs to solve   simultaneous equations visually. | 1. find and interpret: distance, midpoint, slope, point of intersection, and slopes of parallel **~~and perpendicular~~** lines 2. draw graphs of line segments and interpret such graphs in context, including discussing the rate of change (slope) and the 𝑦-intercept |
|  | **AF.4:** select and use suitable strategies (graphic, numeric, algebraic, trial and improvement, working backwards) for finding solutions to: |
|  | **c.** simultaneous linear equations in two variables with coefficients and solutions in ℤ **~~or in~~** ~~ℚ~~ |
|  | **AF.7:** investigate functions so that they can: |
|  | **b.** represent and interpret functions in different ways – graphically (for 𝑥​ ∈ ℕ, ℤ and ℝ, [continuous functions only], as appropriate), diagrammatically, in words and algebraically – using the language and notation of functions (domain, range, co-domain, 𝑓​(𝑥​) =, 𝑓​:𝑥​ ⟼ and 𝑦 =) (drawing the graph of a function given its algebraic expression is limited to linear  and quadratic functions at OL) |
|  | **c.** use graphical methods to find and interpret approximate solutions of equations such as 𝑓​(𝑥​) = 𝑔(𝑥​) **~~and approximate~~  ~~solution sets of inequalities such as~~** ~~𝑓​(𝑥​) < 𝒈(𝑥​)~~ |

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| **Learning experiences:**   * Exploring what simultaneous equations are * Applying the substitution method * Solving simple systems using substitution * Performing complex substitution and verification * Rearranging forms and error-spotting * Performing elimination by addition and subtraction * Coefficient manipulation and balancing * Deciding on the best strategy between elimination and substitution * Solving and verifying tricky systems * Plotting two linear equations * Finding and interpreting the point of intersection | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | |

**Chapter 24: Geometry 3: Triangles**

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| **Year group:** Second Year | **Time period:** March | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 11: Geometry 1: Lines and Angles; Chapter 12:  Geometry 2: Intersecting and  Parallel Lines | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **U.11:** generate general mathematical statements or conjectures based on specific instances  **U.12:** generate and evaluate mathematical arguments and proofs  **U.13:** communicate mathematics effectively: justify their reasoning, interpret their results, explain their conclusions, and use the language and notation of mathematics to express mathematical ideas precisely  **GT.3:** investigate the concept of proof through their engagement with geometry so that they can:   1. perform constructions 1 to 15 in *Geometry for Post-Primary School Mathematics* **~~(constructions 3 and 7 at HL only)~~** 2. recall and use the concepts, axioms, theorems, corollaries and converses, specified in *Geometry for Post-Primary School Mathematics* (section 9 for OL **~~and section 10 for HL~~**)   **II.** theorems 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15 **~~and 11, 12, 19~~**,  and appropriate converses, including relevant operations involving square roots   1. create and evaluate proofs of geometrical propositions 2. display understanding of the proofs of theorems 1, 2, 3, 4, 5, 6,   9, 10, 14, 15 **~~and 13, 19~~**; and of corollaries 3, 4 **~~and 1, 2, 5~~** (full formal proofs are not examinable) | |
| **Key learning:**  Students will:   * learn about the interior and exterior angles of a triangle * construct triangles given three pieces of information * identify congruent triangles * solve problems involving similar triangles. |
| **Learning experiences:**   * Classifying triangles by sides and angles • Using protractors and compasses accurately * Solving unknown angles using equations • Using congruency to justify equal parts of * Solving for unknown exterior/interior angles triangles * Using construction-based angle reasoning • Identifying similar triangles * Constructing triangles given three elements • Using scale factor to find missing lengths (sides/angles) • Understanding proportionality in side ratios | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 25: Geometry 4: Right-Angled Triangles**

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| **Year group:** Second Year | **Time period:** March/April | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 11: Geometry 1: Lines and Angles; Chapter 12:  Geometry 2: Intersecting and  Parallel Lines; Chapter 24: Geometry 3: Triangles | **Learning Outcomes:**  **U.5:** make connections within and between strands  **U.13:** communicate mathematics effectively: justify their reasoning, interpret their results, explain their conclusions, and use  the language and notation of mathematics to express mathematical ideas precisely  **GT.3:** investigate the concept of proof through their engagement with geometry so that they can:   1. perform constructions 1 to 15 in *Geometry for Post-Primary School Mathematics* **~~(constructions 3 and 7 at HL only)~~** 2. recall and use the concepts, axioms, theorems, corollaries and converses, specified in *Geometry for Post-Primary School Mathematics* (section 9 for OL **~~and section 10 for HL~~**)    1. theorems 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15 **~~and 11, 12,~~**   **~~19~~**, and appropriate converses, including relevant operations involving square roots   * 1. corollaries 3, 4 **~~and 1, 2, 5~~** and appropriate converses  1. use **~~and explain~~** the terms: theorem, proof, axiom, corollary, converse and implies 2. create and evaluate proofs of geometrical propositions 3. display understanding of the proofs of theorems 1, 2, 3, 4, 5,   6, 9, 10, 14, 15 **~~and 13, 19~~**; and of corollaries 3, 4 **~~and 1, 2, 5~~**  (full formal proofs are not examinable) | |
| **Key learning:**  Students will:   * construct right-angled triangles * use the Pythagorean theorem to find missing side lengths of right- angled triangles * solve real-world problems with the Pythagorean theorem * examine the properties of cyclic right-angled triangles. |
| **Learning experiences:**   * Constructing right-angled triangles using R – H – S and A – S – A * Stating and applying the Pythagorean theorem * Finding missing side lengths using the formula * Using the theorem in practical contexts (ladders, ramps, flight paths) * Interpreting diagrams and structuring solutions * Proving if a triangle is right-angled using side lengths * Spotting errors in Pythagorean theorem applications * Using circle geometry and the Pythagorean theorem together * Identifying cyclic triangles and solving for radius/angle | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 26: Area, Surface Area and Volume**

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| **Year group:** Second Year | **Time period:** April/May | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 10: Length, Polygons and Perimeter | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **U.6:** make connections between mathematics and the real world  **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **U.9:** interpret their solution to a problem in terms of the original question  **GT.2:** investigate 2D shapes and 3D solids so that they can:   1. draw and interpret scaled diagrams 2. draw and interpret nets of rectangular solids, **~~prisms (polygonal~~  ~~bases), cylinders~~** 3. find the perimeter and area of plane figures made from combinations of discs, triangles and rectangles, including relevant operations involving pi 4. find the volume of rectangular solids, cylinders, **~~triangular-~~ ~~based prisms, spheres~~** and combinations of these, including relevant operations involving pi 5. find the surface area and **~~curved surface area (as appropriate)~~** of rectangular solids, **~~cylinders, triangular-based prisms,~~  ~~spheres~~** and combinations of these | |
| **Key learning:**  Students will:   * find the area of different shapes * find the surface area of cuboids * find the volume of cuboids. |
| **Learning experiences:**   * Finding areas of rectangles, triangles and • Calculating surface area using formulas parallelograms • Completing basic surface area tasks * Using formulas and the FIFA strategy • Using the volume formula * Finding areas by decomposition • Understanding units: cm³, m³, conversions * Working with combinations of rectangles and • Converting cm³ to ml and litres triangles • Solving real-life problems * Drawing and interpreting nets of cuboids * Identifying dimensions and face areas | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 27: Statistics 3**

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| **Year group:** Third Year | **Time period:** September | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 9: Statistics 1;  Chapter 20: Statistics 2 | **Learning Outcomes:**  **U.5:** make connections within and between strands  **U.6:** make connections between mathematics and the real world  **U.9:** interpret their solution to a problem in terms of the original question  **U.10:** evaluate different possible solutions to a problem, including evaluating the reasonableness of the solutions, and exploring possible improvements and/or limitations of the solutions (if any)  **U.13:** communicate mathematics effectively: justify their reasoning, interpret their results, explain their conclusions, and use the language and notation of mathematics to express mathematical ideas precisely  **SP.3:** carry out a statistical investigation which includes the ability to:  **e.** select, calculate and interpret appropriate summary statistics to describe aspects of univariate data. Central tendency: mean  **~~(including of a grouped frequency distribution)~~**, median, mode.  Variability: range  **g.** discuss misconceptions and misuses of statistics  **h.** discuss the assumptions and limitations of conclusions drawn from sample data or graphical/numerical summaries of data | |
| **Key learning:**  Students will:   * learn how to calculate the mode, median and mean averages of data sets * choose, calculate and interpret appropriate averages to summarise data. |
| **Learning experiences:**   * Exploring definitions and methods for finding the mode and the median * Finding the mode in numerical and categorical data * Finding the median from odd and even sets * Examining real-world representations (bar charts, stem and leaf plots, pie charts) * Solving multi-part questions involving the mode and the median * Using the formula for the mean * Using raw data and frequency tables * Finding missing values when the mean is known * Solving real-world problems involving averages * Comparing the mean with other averages * Defining and interpreting the range * Knowing when to use the mean, the median or the mode * Understanding the effects of outliers | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 28: Patterns**

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| **Year group:** Third Year | **Time period:** September | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 22:  Co-ordinate Geometry 2 | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations | |
| **Key learning:** |
| Students will:   * investigate visual patterns | **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions | |
| * examine number sequences and identify term-to-term rules | **AF.1:** investigate patterns and relationships (linear, quadratic, doubling and tripling) in number, spatial patterns and real-world phenomena involving change so that they can: | |
| * use the general/*n*th term to identify terms in linear sequences * decide if sequences are linear or non-linear | 1. represent these patterns and relationships in tables and graphs 2. generate a generalised expression for linear **~~and quadratic~~**   patterns in words and algebraic expressions and fluently convert between each representation | |
| * graph linear sequences. | **c.** categorise patterns as linear, non-linear**~~, quadratic and~~  ~~exponential (doubling and tripling)~~** using their defining characteristics as they appear in the different representations | |
| **Learning experiences:**   * Identifying and describing visual/repeating patterns * Predicting elements in patterns using cycles * Working on coloured shape sequences and repeat cycles * Identifying rules * Predicting terms and filling missing values * Exploring the general form of linear sequences * Finding *a* and *d*, building *n*th term expressions * Practising with T*n* = *a* + (*n* − 1)*d* * Plotting sequences as points * Interpreting slope from common difference * Connecting to 𝑦 = 𝑚𝑥​ +  𝑐 * Graphing linear sequences | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 29: Financial Maths**

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| **Year group:** Third Year | **Time period:** October | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 4: Working with Numbers; Chapter 15: Ratio and Proportion | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.6:** make connections between mathematics and the real world  **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **U.9:** interpret their solution to a problem in terms of the original question  **N.2:** investigate equivalent representations of rational numbers so that they can:  **b.** use and understand ratio and proportion  **c.** solve money-related problems including those involving bills, VAT, profit or loss, % profit or loss (on the cost price), cost price, selling price, compound interest for not more than 3 years, income tax (standard rate only), net pay (including other deductions of specified amounts), value for money calculations and judgements, **~~mark up (profit as a % of cost price), margin~~ ~~(profit as a % of selling price), compound interest, income~~  ~~tax and net pay (including other deductions)~~** | |
| **Key learning:**  Students will:   * solve financial maths problems involving percentages * work with VAT and profit and loss percentages * calculate income after income tax has been deducted * interpret household bills and calculate total   amounts owed on them   * calculate interest on loans and savings * convert money into different currencies. |
| **Learning experiences:**   * Using the multiplier method for increase/decrease * Reversing percentage and percentage change * Working with VAT-inclusive and VAT-exclusive pricing * Doing profit/loss calculations and percentages * Working with income: gross income, tax credit, net income, PRSI, USC, pensions and net pay * Interpreting electricity, phone and service bills * Understanding compound interest * Using the formula 𝐹 = 𝑃(1 +  𝑖)𝑡 * Using multipliers to convert between currencies | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 30: Circles and Cylinders**

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| **Year group:** Third Year | **Time period:** October/November | |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 10: Length, Polygons and Perimeter; Chapter 11: Geometry 1: Lines and Angles | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **GT.2:** investigate 2D shapes and 3D solids so that they can:  **c.** find the perimeter and area of plane figures made from combinations of discs, triangles and rectangles, including relevant operations involving pi  **d.** find the volume of rectangular solids, cylinders,  **~~triangular-based prisms, spheres~~** and combinations of these, including relevant operations involving pi | |
| **Key learning:**  Students will:   * label the different parts of a circle * calculate the perimeter of circles, semicircles and composite shapes using pi * calculate the area of circles, semicircles and composite shapes using pi * calculate the volume of cylinders. |
| **Learning experiences:**   * Exploring parts of a circle: radius, diameter, chord, circumference * Working with the circumference formula: 𝑙 = 2𝜋𝑟 * Working with formula for semicircle perimeter: 𝜋𝑟 + d * Calculating the perimeter of composite shapes * Working with the area formula: 𝐴 = 𝜋𝑟2 * Approximation using slicing technique * Calculating the area of a semicircle * Working with the volume formula: 𝑉 = 𝜋𝑟2 ℎ * Working on real-life and reasoning problems * Making volume comparisons with same radius versus height | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 31: Geometry 5: Quadrilaterals and Symmetry**

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| **Year group:** Third Year | **Time period:** November | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 10: Length, Polygons and Perimeter; Chapter 11: Geometry 1: Lines and Angles; Chapter 12:  Geometry 2: Intersecting and  Parallel Lines | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **U.8:** apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **U.11:** generate general mathematical statements or conjectures based on specific instances  **U.12:** generate and evaluate mathematical arguments and proofs  **U.13:** communicate mathematics effectively: justify their reasoning, interpret their results, explain their conclusions, and use the language and notation of mathematics to express mathematical ideas precisely  **GT.3:** investigate the concept of proof through their engagement with geometry so that they can:   1. perform constructions 1 to 15 in *Geometry for Post-Primary School Mathematics* **~~(constructions 3 and 7 at HL only)~~** 2. recall and use the concepts, axioms, theorems, corollaries and converses, specified in *Geometry for Post-Primary School Mathematics* (section 9 for OL **~~and section 10 for HL~~**)   **II.** theorems 1, 2, 3, 4, 5, 6, 9, 10, 13, 14, 15 **~~and 11, 12, 19~~**, and  appropriate converses, including relevant operations involving square roots  **e.** display understanding of the proofs of theorems 1, 2, 3, 4, 5, 6, 9,  10, 14, 15 **~~and 13, 19~~**; and of corollaries 3, 4 **~~and 1, 2, 5~~** (full formal proofs are not examinable)  **GT.6:** investigate transformations of simple objects so that they can:  **b.** draw the axes of symmetry in shapes | |
| **Key learning:**  Students will:   * work with angles in quadrilaterals * recall the properties of angles, sides   and diagonals in parallelograms   * solve problems involving angles and sides in parallelograms * construct rectangles * identify and draw axes of symmetry. |
| **Learning experiences:**   * Solving for missing angles in quadrilaterals • Justifying angle reasoning in diagrams * Working with opposite angles and sides in • Solving mixed problems with perimeters and sides quadrilaterals • Using a compass and a straight edge to * Measuring angles in quadrilaterals and construct rectangles   discussing triangle connections • Doing step-by-step construction tasks   * Working with parallelogram angle theorems • Understanding axes of symmetry * Using alternate and vertically opposite angles • Debating symmetry properties | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 32: Functions**

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| **Year group:** Third Year | **Time period:** December | |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 22: Co-ordinate  Geometry 2;  Chapter 23: Algebra 4: Simultaneous Equations | **Learning Outcomes:**  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **N.4:** analyse numerical patterns in different ways, including making out tables and graphs, and continue such patterns  **AF.4:** select and use suitable strategies (graphic, numeric, algebraic, trial and improvement, working backwards) for finding solutions to:   1. linear equations in one variable with coefficients in ℚ and solutions in ℤ **~~or in~~** ~~ℚ~~   **AF.7:** investigate functions so that they can:   1. demonstrate understanding of the concept of a function 2. represent and interpret functions in different ways – graphically (for 𝑥​ ∈ ℕ, ℤ and ℝ, [continuous functions only], as appropriate), diagrammatically, in words and algebraically – using the language and notation of functions (domain, range, co-domain, 𝑓​(𝑥​) =,   𝑓​:𝑥​ ⟼ and 𝑦 =) (drawing the graph of a function given its algebraic  expression is limited to linear and quadratic functions at OL)  **d.** make connections between the shape of a graph and the story of a phenomenon, including identifying and interpreting maximum and minimum points | |
| **Key learning:**  Students will:   * define what a function is * investigate functions using mapping diagrams * learn to read and write function notation * graph functions using inputs and output tables * use your understanding of graphs to solve problems. |
| **Learning experiences:**   * Spotting valid functions • Solving for unknowns using 𝑓​(𝑥​) = 𝑎​ * Writing and interpreting ordered pairs • Completing advanced substitution tasks * Understanding domain, codomain and range • Graphing from tables and identifying the * Working with one-to-one and many-to-one slope/intercept   mappings • Drawing and interpreting graphs   * Understanding 𝑓​(𝑥​), evaluating for given inputs • Using function graphs for values and * Reversing output to input comparisons * Working on structured inputs and mapping • Reading output for given input and vice versa evaluations • Exploring the shape and structure of parabolas * Substituting into functions • Drawing smooth curves from function tables | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 33: Real-Life Problems: Distance, Time, Speed and Graphs**

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| **Year group:** Third Year | **Time period:** December |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 22: Co-ordinate  Geometry 2;  Chapter 32: Functions | **Learning Outcomes:**  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret, analyse and compare such representations  **U.5:** make connections within and between strands  **U.6:** Make connections between mathematics and the real world  **U.8:** Apply their knowledge and skills to solve a problem, including decomposing it into manageable parts and/or simplifying it using appropriate assumptions  **U.10:** evaluate different possible solutions to a problem, including evaluating the reasonableness of the solutions, and exploring possible improvements and/or limitations of the solutions (if any)  **N.3:** investigate situations involving proportionality so that they can:  **a.** use absolute and relative comparison where appropriate |
| **Key learning:**  Students will:   * work with units of time and read timetables * solve real-life problems involving distance, speed and time |
| * read and interpret distance–time graphs, direct proportion graphs and quadratic graphs. | **b.** solve problems involving proportionality including those involving currency conversion and those involving average speed, distance and time  **N.4:** analyse numerical patterns in different ways, including making out tables and graphs, and continue such patterns  **GT.1:** calculate, interpret and apply units of measure and time |
|  | **AF.1:** investigate patterns and relationships (linear, quadratic, doubling and tripling) in number, spatial patterns and real-world phenomena involving change so that they can: |
|  | **a.** represent these patterns and relationships in tables and graphs |
|  | **b.** generate a generalised expression for linear **~~and quadratic~~**  patterns in words and algebraic expressions and fluently convert between each representation |
|  | **AF.2:** investigate situations in which letters stand for quantities that are variable so that they can: |
|  | **c.** use the concept of equality to generate and interpret equations |
|  | **AF.7:** investigate functions so that they can: |
|  | **b.** represent and interpret functions in different ways – graphically (for 𝑥​ ∈ ℕ, ℤ and ℝ, [continuous functions only], as appropriate), diagrammatically, in words and algebraically – using the language and notation of functions (domain, range, co-domain,  𝑓​(𝑥​) =, 𝑓​:𝑥​ ⟼ and 𝑦 =) (drawing the graph of a function given its algebraic expression is limited to linear and quadratic functions  at OL) |

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| **Learning experiences:**   * Completing time duration calculations * Reading and interpreting timetables * Adding and subtracting time intervals * Using the speed triangle * Completing unit conversions in real-life contexts * Solving word problems with layered logic * Interpreting journeys with multiple subjects * Comparing speeds and identifying segments * Graphing and interpreting currency, cost, wages * Interpreting real-life parabolas | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | |

**Chapter 34: Trigonometry**

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| **Year group:** Third Year | **Time period:** January | |
| **Prior knowledge:**  Primary Mathematics Curriculum; Chapter 24: Geometry 3: Triangles;  Chapter 25: Geometry 4: Right-Angled  Triangles | **Learning Outcomes:**  **U.2:** apply the procedures associated with each strand accurately, effectively and appropriately  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.6:** Make connections between mathematics and the real world  **U.9:** interpret their solution to a problem in terms of the original question  **U.10:** evaluate different possible solutions to a problem, including evaluating the reasonableness of the solutions, and exploring possible improvements and/or limitations of the solutions (if any)  **GT.4:** evaluate and use trigonometric ratios (sin, cos and tan, defined in terms of right-angled triangles) and their inverses, involving angles between 0° and 90° at integer values **~~and in decimal form~~** | |
| **Key learning:**  Students will:   * label right-angled triangles * learn about trigonometric ratios: sin, cos and tan * use trigonometric ratios to find missing sides * find missing angles using trigonometric ratios * solve real-world trigonometry problems. |
| **Learning experiences:**   * Labelling the sides of right-angled triangles based on a reference angle * Understanding sine, cosine, tangent definitions * Finding missing sides of triangles * Discovering patterns in triangle ratios * Applying SOH/CAH/TOA to solve for sides * Using the inverse of sin, cos, tan * Developing calculator skills and identifying common errors * Completing angle-finding questions * Solving real-world trigonometry problems | | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | | |

**Chapter 35: Algebra 5: Factorising and Solving Equations**

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| **Year group:** Third Year | **Time period:** March/April |
| **Prior knowledge:** Primary Mathematics Curriculum; Chapter 5: Algebra 1: Reading and Writing Letters; Chapter 6: Algebra 2: Equations and Inequalities;  Chapter 21: Algebra 3: Equations and Word Problems; Chapter 23:  Algebra 4: Simultaneous  Equations | **Learning Outcomes:**  **U.3:** recognise that equality is a relationship in which two mathematical expressions have the same value  **U.4:** represent a mathematical situation in a variety of different ways, including: numerically, algebraically, graphically, physically, in words; and to interpret**,** analyse and compare such representations  **U.10:** evaluate different possible solutions to a problem, including evaluating the reasonableness of the solutions, and exploring possible improvements and/or limitations of the solutions (if any)  **U.13:** communicate mathematics effectively: justify their reasoning, interpret their results, explain their conclusions, and use the language and notation of mathematics to express mathematical ideas precisely  **AF.3:** apply the properties of arithmetic operations and factorisation to generate equivalent expressions so that they can develop and use appropriate strategies to:   1. add, subtract and simplify   **II.** quadratic expressions in one variable with coefficients in ℤ  **d.** flexibly convert between the factorised and expanded forms of algebraic expressions of the form:   1. 𝑎​𝑥​𝑦, where 𝑎​ ∈ ℤ 2. 𝑎​𝑥​𝑦 + 𝑏𝑦z, where 𝑎​, 𝑏 ∈ ℤ 3. 𝑠𝑥​ −  𝑡𝑦 +  𝑡𝑥​ −  𝑠𝑦, where 𝑠, 𝑡 ∈ ℤ 4. 𝑑𝑥​2 + 𝑏𝑥​; 𝑥​2 + 𝑏𝑥​ + 𝑐; **and** 𝒂𝒙**2 +** 𝒃𝒙 **+** 𝒄, where 𝑏, 𝑐, 𝑑 ∈ ℤ   **~~and~~** ~~𝒂 ∈ ℕ~~   1. 𝑥​2 −  𝑎​2 **and** 𝒂**2**𝒙**2 −** 𝒃**2**𝒚**2**, where 𝑎​, 𝑏 ∈ ℤ   **AF.4:** select and use suitable strategies (graphic, numeric, algebraic, trial and improvement, working backwards) for finding solutions to:  **b.** quadratic equations in one variable with coefficients and solutions in ℤ **~~or coefficients in~~** ~~ℚ~~ **~~and solutions in~~** ~~ℝ~~  **AF.7:** investigate functions so that they can:  **c.** use graphical methods to find and interpret approximate solutions of equations such as 𝑓​(𝑥​) = 𝑔(𝑥​) **~~and approximate~~  ~~solution sets of inequalities such as~~** ~~𝑓​(𝑥​) < 𝒈(𝑥​)~~ |
| **Key learning:**  Students will:   * identify the highest common factor between terms * factorise linear and quadratic expressions * use factorising to solve quadratic equations * connect quadratic solutions to features on a quadratic graph. |

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| **Learning experiences:**   * Practising with numeric/algebraic HCF * Factoring out constants and variables from two-term expressions * Completing multi-step factorising with signs * Analysing common errors and edge cases * Using grouping and array models for four-term expressions * Factorising binomials from pairs of terms * Practising grouping reasoning * Recognising perfect squares and subtraction structure * Applying array models and formulas * Finding two numbers that multiply and add to match coefficients * Using the trial and improvement strategy * Avoiding sign mistakes * Identifying errors in peer work * Setting up quadratic expressions equal to 0 * Using factorising to solve equations and interpret graph roots * Discussing graphical links to algebraic solutions | |
| **Assessment:**   * Entry Level activity * Let’s Discuss activities * Differentiated exercises * Level Complete activity * Revision Blaster exercises * Exam Link questions | **Possible resources:**   * *Level Up 1* textbook * *Level Up 1* Teacher’s Resource Book * *Level Up 1* digital resources |
| **Teacher reflection:** | |

***Level Up 1*** – Teacher’s Resource Book

**Scheme of work**

**Blank planning templates**

**60**

Please note that this template is available at: [**www.educateplus.ie**](http://www.educateplus.ie/)

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| **Unit of learning** | **Learning intentions** | **LOs** | **Key Skills** | **Assessment opportunities** |
| **Chapter \_\_\_:**  **Time period:** | Students will: |  |  |  |

**Departmental units of learning plan**

Please note that this template is available at: [**www.educateplus.ie**](http://www.educateplus.ie/)

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| **Year group:** | **Time period:** | |
| **Prior knowledge:** | **Learning Outcomes:** | |
| **Key learning:** |
| **Learning experiences:** | | |
| **Assessment:** | | **Possible resources:** |
| **Teacher reflection:** | | |