|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit Overview: Algebraic Expressions**  **Quadratics, Equations and Inequalities, Graph Transformation, Modelling in mechanics, Constant acceleration, Measure of location and spread and Statistical distribution** | | | | | | | | | | |
| **Half- Term:** | AUT 1 | AUT 2 | SPR 1 | SPR 2 | | SUM 1 | SUM 2 | | **No of Lessons:** | **30** |
| **Key Focus for Unit:**  *What is the key knowledge being delivered?*  *What is the intent of this unit?* | | | | | | | | | | |
| **Pure Maths**   * Solve indices problems in context and complete simple proofs involving indices * Rationalise the denominator of a fraction with a surd expression as denominator * Solve problems involving surds in context and complete simple proofs involving surds * Understand and use the discriminant; conditions for real, repeated and no real roots * Solve problems involving the discriminant in context and construct simple proofs involving the discriminant * Represent solutions to quadratic inequalities using set notation * Represent linear and quadratic inequalities on graphs * Solve problems involving linear and quadratic inequalities in context * Sketch graphs of the form y = a/x^2 * Use intersection points of graphs to solve equations * Understand and use properties of asymptotes for graphs of the form y = a/x and y = a/x^2 * Transform graphs of unfamiliar functions | | | | | Applied (Mechanics)   * Calculate and interpret gradients of displacement/time graphs * Use and interpret graphs of velocity against time * Calculate and interpret gradients of velocity/time graphs * Calculate and interpret areas under velocity/time graphs * Use graphs to derive the equations of motion * Derive the other equations of motion algebraically * Use the equations of motion to solve problems in familiar contexts * Understand gravitational acceleration, its dependence on location and its value to varying degrees of accuracy * Use the equations of motion to solve problems involving vertical motion * Use the equations of motion to solve problems in unfamiliar contexts * Use the equations of motion in vector form to solve problems in 2D   Applied (Statistics)   * Understand and carry out stratified sampling * Understand quota and opportunity sampling * Use sampling in the context of the large data set * Select and critique a sampling technique in a given context * Understand the implication of differences in the results from different samples * Understand the principle of coding * Calculate the mean and standard deviation of coded data * Use statistical calculations in the context of the large data set * Be able to use and calculate the statistic Sxx and understand its connection with the standard deviation | | | | | |
| **Key Knowledge and Big Ideas:**  *What* ***Powerful Knowledge*** *and* ***Big Ideas*** *are explored in this Unit?*  *How have these progressed from previous learning? What* ***gaps in knowledge*** *have you identified from* ***baselining*** *and how are these being closed?* | | | | | | | | | | |
| **BIG IDEAS:**  Algebra  Probability and Mechanics  **Powerful Knowledge:**   * Solve complex indices problems * Rationalise the denominator of a surd * Graph Transformation * Use SUVAT formula to solve complex problems * Calculate variance and standard deviation * Statistical distribution   **Previous Learning:**   * Factorise Quadratics * Solving Quadratic Equations by factorising, by completing the square and by using the quadratic formula * Indices and Surds * Graph Transformation   **Gaps in Knowledge and Misconceptions:**   * Students use the wrong inequality sign when writing the solution set for quadratic inequalities * Not realising that the standard deviation will stay the same if you add/subtract the same amount from each data value. * Students not resolving in the direction of acceleration | | | | | | | | | | |
| **Unit Assessment:**  *How will this unit be assessed?*  *What is the frequency of assessments – baselines etc?* | | | | | | | | | | |
| How we will assess   * Students will be assessed at the end of each chapter using past exam questions. These assessments will be cumulative so the chapter 2 assessment will test content from Chapter 1 and so on. | | | | | | | | | | |
| **Key Retrieval Topics (Interleaving):**   * Indices * Surds * Discriminant * Completing the square * Graph Transformation | | | | | | | | | | |
| **Key Skills Explored** | | | **Vocabulary Selected for DVI** | | | | | **Links to Previous Unit** | | |
| Pure   * Solving Quadratics * Solving Inequalities * Graph Transformation   Applied (Mechanics)   * Modelling in mechanics * Constant acceleration   Applied (Statistics)   * Measure of location and spread * Statistical distribution | | | * Roots * Discriminant * Surds * Turning Point * Velocity * Displacement * Variance * Standard Deviation * Gravity | | | | | * The units covered in Autumn 1 builds on the work students covered in GCSE Maths Higher Tier | | |
| **Links to Careers/Employability** | | | **How does this unit prepare students for the next unit?** | | | | | | | |
| * Teaching * Engineering * Accounting * Banking * Architecture | | | * Straight Line Graphs * Circles * Algebraic Methods * Constant acceleration * Probability * Data collection | | | | | | | |