|  |
| --- |
| **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:** AlgebraProbability 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
 |