**Curriculum Overview for Mathematics**

**Year 11**

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| **Foundation****Half Term 1: Representing Number****Declarative Knowledge:**Recognise powers of 2, 3, 4, 5Know the meaning of inequalityKnow the meaning of less than and more than (or equal to) signs**Procedural Knowledge:**Round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)Use inequality notation to specify simple error intervals due to truncation or roundingUse positive integer powers and associated real roots (square, cube and higher)Calculate with roots and with integer indicesCalculate with and interpret standard form A x 10n where1≤ A < 10 and `n` is an integerSolve linear inequalities in one variableRepresent the solution set on a number line**Conditional Knowledge:** Apply and interpret limits of accuracyUnderstand and use place value in context (e.g. when working with very large or very small numbers) | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Standard form Inequality Truncate Round Minimum, Maximum Interval Decimal place Significant figure(Linear) inequality Unknown Manipulate Solve Solution Set Integer |
| Checklist RTL | A formal end of unit exam will take place at the end of the unit. The questions will be taken from the exam board bank of questions. Reteaching / relearning will be class dependent subject to the performance of the class.  |
| Home | Practise Exam Questions based on the current unit or previous units to build recall. Dr Frost Maths – practising skills using DrFrost.org (a unique username and password will be provided by the school)We expect Year 11 pupils to spend 1 hour on Maths homework per week (on average over the half-term – this may be higher nearer exams or lower at other times). |
| **Half Term 1: Algebra and Graphs****Declarative Knowledge:**Know that linear graphs form a straight lineRecognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function  **Procedural Knowledge:**Solve linear equations in one unknown algebraicallyIncluding those with the unknown on both sides of the equationFind approximate solutions using a graphTranslate simple situations or procedures into algebraic expressions or formulaederive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution**Conditional Knowledge:** Translate simple situations or procedures into algebraic expressions or formulaederive an equation (or two simultaneous equations), solve the equation(s) and interpret the solution | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Algebra, algebraic, algebraically, Unknown, Equation, Operation, Solve, Solution, Brackets, Symbol, Substitute, Graph, Function, equation Quadratic, cubic, reciprocal Gradient, y-intercept, x-intercept, root Sketch, plot Kinematic Speed, distance, time, Acceleration, deceleration Linear, non-linear, Parabola |
| Checklist RTL | A formal end of unit exam will take place at the end of the unit. The questions will be taken from the exam board bank of questions. Reteaching / relearning will be class dependent subject to the performance of the class.  |
| Home | Practise Exam Questions based on the current unit or previous units to build recall. Dr Frost Maths – practising skills using DrFrost.org (a unique username and password will be provided by the school)We expect Year 11 pupils to spend 1 hour on Maths homework per week (on average over the half-term – this may be higher nearer exams or lower at other times).  |

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| **Higher****Half Term 1: Representing Number****Declarative Knowledge:*** Recognise powers of 2, 3, 4, 5

**Procedural Knowledge:*** Round numbers and measures to an appropriate degree of accuracy (e.g. to a specified number of decimal places or significant figures)
* Use inequality notation to specify simple error intervals due to truncation or rounding
* Use positive integer powers and associated real roots (square, cube and higher)
* Calculate with roots, and with integer **and fractional** indices
* Understand and use place value (e.g. when working with very large or very small numbers)
* Calculate with and interpret standard form https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/standard_form/a%20x%2010%5En.jpg where https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/1%20less%20than%20equal%20to%20a%20less%20than%2010.jpg and `n` is an integer
* **Calculate exactly with surds**
* **Simplify surd expressions involving squares (eg `sqrt 12 = sqrt(4 xx 3) = sqrt 4 xx sqrt 3 = 2 sqrt 3`) and rationalise denominators**
* Recognise and use simple geometric progressions (*rⁿ* where *n* is an integer and ***r* is a surd**)

**Conditional Knowledge:** * Apply and interpret limits of accuracy **including upper and lower bounds**
* **Estimate powers and roots of any given positive number**
 | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Power Root Index, Indices Standard form Inequality Truncate Round Minimum, Maximum Interval Decimal place Significant figure |
| Checklist RTL | A formal end of unit exam will take place at the end of the unit. The questions will be taken from the exam board bank of questions. Reteaching / relearning will be class dependent subject to the performance of the class. |
| Home | Practise Exam Questions based on the current unit or previous units to build recall. Dr Frost Maths – practising skills using DrFrost.org (a unique username and password will be provided by the school)We expect Year 11 pupils to spend 1 hour on Maths homework per week (on average over the half-term – this may be higher nearer exams or lower at other times). |
| **Half Term 1: Algebra: quadratics, rearranging, formulae and identities****Declarative Knowledge:**Know the difference between an equation and an identity**Procedural Knowledge:**Simplify and manipulate algebraic expressions (including those involving surds) by: expanding products of two **or more** binomials; factorising quadratic expressions of the form https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/Algebra_intro_to_quadratics_/x%5E2%20+%20bx%20+%20c.jpg?cb=20201021 including the difference of two squares; **factorising quadratic expressions of the form**https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/Algebra_intro_to_quadratics_/x%5E2%20+%20bx%20+%20c.jpg?cb=20201021**;** simplifying expressions involving sums, products and powers, including the laws of indicesUnderstand and use standard mathematical formulaeRearrange formulae to change the subjectRecognise, sketch and interpret graphs of linear functions, quadratic functions, simple cubic functions and the reciprocal function https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/further_sketching_graphs/y%20equals%201%20over%20x.jpg with https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/further_sketching_graphs/x%20not%20equal%20to%200.jpg, **exponential functions https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/further_sketching_graphs/y%20=%20kx.jpgfor positive values of https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/further_sketching_graphs/k.jpg, and the trigonometric functions (with arguments in degrees) https://allaboutmaths.aqa.org.uk/custom_content/8300_Foundation_images/further_sketching_graphs/y%20=sin%20x,%20y%20=%20cos%20x%20and%20y%20=%20tan%20x.jpg for angles of any size****Conditional Knowledge:** Argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **and proofs**Where appropriate, interpret simple expressions as functions with inputs and outputs**Interpret the reverse process as the ‘inverse function’****Interpret the succession of two functions as a ‘composite function’** | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Inequality, Identity, Equivalent, Equation, Formula, Formulae, Expression, Expand, Linear, QuadraticExponential Function, equation Linear, non-linear Quadratic, cubic, reciprocal, exponential Parabola Asymptote Maximum, minimum, period Gradient, y-intercept, x-intercept, root Sketch, plot Arguments |
| Checklist RTL | A formal end of unit exam will take place at the end of the unit. The questions will be taken from the exam board bank of questions. Reteaching / relearning will be class dependent subject to the performance of the class. |
| Home | Practise Exam Questions based on the current unit or previous units to build recall. Dr Frost Maths – practising skills using DrFrost.org (a unique username and password will be provided by the school)We expect Year 11 pupils to spend 1 hour on Maths homework per week (on average over the half-term – this may be higher nearer exams or lower at other times). |

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| **Foundation** **Half Term 2: Probability****Declarative Knowledge:**Apply the property that the probabilities of an exhaustive set of outcomes sum to one**Procedural Knowledge:**Record, describe and analyse the frequency of outcomes of probability experiments using tables and frequency treesConstruct theoretical possibility spaces for single and combined experiments with equally likely outcomes and use these to calculate theoretical probabilitiesApply ideas of randomness, fairness and equally likely events to calculate expected outcomes or multiple future experiments**Conditional Knowledge:** Understand that empirical unbiased samples tend towards theoretical probability distributions with increasing sample sizeEnumerate sets and combinations of sets systematically using tables, grids, Venn diagrams and tree diagramsCalculate the probability of independent and dependent combined events in context, including using tree diagrams and other representations, and know the underlying assumptions | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Outcome, equally likely outcomes Event, independent event, dependent event Tree diagrams Theoretical probability Experimental probability Random Bias, unbiased, fair Relative frequency Enumerate Se |
| Checklist RTL | A formal end of unit exam will take place at the end of the unit. The questions will be taken from the exam board bank of questions. Reteaching / relearning will be class dependent subject to the performance of the class. |
| Home | Practise Exam Questions based on the current unit or previous units to build recall. Dr Frost Maths – practising skills using DrFrost.org (a unique username and password will be provided by the school)We expect Year 11 pupils to spend 1 hour on Maths homework per week (on average over the half-term – this may be higher nearer exams or lower at other times). |
| **Half Term 2: Vectors and Measures****Declarative Knowledge:**Know that a vector has a magnitude and a directionKnow standard units of measure and related concepts (length, area, volume / capacity, mass, time, money etc)**Procedural Knowledge:**Understand addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectorsChange freely between related standard units (e.g. time, length, area, volume / capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contextsUse compound units such as speed, rates of pay, unit pricing, density and pressure**Conditional Knowledge:** Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectorsUse standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriate | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Vector, Scalar, Constant, Magnitude,Direct proportion, Inverse proportion, Multiplier, Linear, Congruent, Congruence, Similar, Similarity, Compound unit, Density, Population density, Pressure, Surd, Limit |
| Checklist RTL | A formal end of unit exam will take place at the end of the unit. The questions will be taken from the exam board bank of questions. Reteaching / relearning will be class dependent subject to the performance of the class. |
| Home | Practise Exam Questions based on the current unit or previous units to build recall. Dr Frost Maths – practising skills using DrFrost.org (a unique username and password will be provided by the school)We expect Year 11 pupils to spend 1 hour on Maths homework per week (on average over the half-term – this may be higher nearer exams or lower at other times). |
| **Higher** **Half Term 2: Further Equations with graphs****Declarative Knowledge:**Know the difference between a linear and a quadratic graph.**Procedural Knowledge:*** Solve linear equations in one unknown algebraically including those with the unknown on both sides of the equation
* Find approximate solutions using a graph
* Solve quadratic equations **(including those that require rearrangement)** algebraically by factorising, **by completing the square and by using the quadratic formula**
* Find approximate solutions using a graph
* Identify and interpret roots, intercepts and turning points of quadratic functions graphically; deduce roots algebraically **and turning points by completing the square**

**Conditional Knowledge:** * Recognise, sketch and interpret graphs of linear and quadratic functions
* Translate simple situations or procedures into algebraic expressions or formulae
* derive an equation, solve the equation and interpret the solution
 | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Quadratic) equation Factorise Rearrange Complete the square Unknown Manipulate Maximum, minimum Parabola Recurrence relation Interval bisection |
| Checklist RTL | A formal end of unit exam will take place at the end of the unit. The questions will be taken from the exam board bank of questions. Reteaching / relearning will be class dependent subject to the performance of the class. |
| Home | Practise Exam Questions based on the current unit or previous units to build recall. Dr Frost Maths – practising skills using DrFrost.org (a unique username and password will be provided by the school)We expect Year 11 pupils to spend 1 hour on Maths homework per week (on average over the half-term – this may be higher nearer exams or lower at other times). |
| **Half Term 2: Probability****Declarative Knowledge:****Procedural Knowledge:*** Calculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions
* **Calculate conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams**
* Enumerate sets and combinations of sets systematically, using tables, grids, Venn diagrams and tree diagrams

**Conditional Knowledge:** * Apply ideas of randomness, fairness and equally likely events to calculate expected outcomes or multiple future experiments
* Understand that empirical unbiased samples tend towards theoretical probability distributions with increasing sample size
* **Interpret conditional probabilities through representation using expected frequencies with two-way tables, tree diagrams and Venn diagrams**
 | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Outcome, equally likely outcomes Event, independent event, dependent event Tree diagrams Theoretical probability Experimental probability Random Bias, unbiased, fair Relative frequency Enumerate Se |
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| **Half Term 2: Vectors and Measures****Declarative Knowledge:****Know that vectors have a direction and a magnitude.** Know standard units of measure and related concepts (length, area, volume / capacity, mass, time, money etc)**Procedural Knowledge:**Apply addition and subtraction of vectors, multiplication of vectors by a scalar, and diagrammatic and column representation of vectorsUse standard units of mass, length, time, money and other measures (including standard compound measures) using decimal quantities where appropriateChange freely between related standard units (e.g. time, length, area, volume / capacity, mass) and compound units (e.g. speed, rates of pay, prices, density, pressure) in numerical and algebraic contextsUse compound units such as speed, rates of pay, unit pricing, density and pressure**Conditional Knowledge:** **Use vectors to construct geometric arguments and proofs** | Books | Modelling reading of questions by the class teacher – teaching like a Mathematician Two key words at the start of each lesson defined Expectation of Mathematical vocabulary used in lessons |
| Speech | Vector, Scalar, Constant, Magnitude,Direct proportion, Inverse proportion, Multiplier, Linear, Congruent, Congruence, Similar, Similarity, Compound unit, Density, Population density, Pressure, Surd, Limit |
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