



YEAR 12 Autumn TERM 1

'An ambitious curriculum that meets the needs of all'

Medium Term Planning – Units 1-4 PURE

Algebraic Expressions, Quadratics, Equations & Inequalities, Graphs & Transformations

Medium Term Planning – Units 1-3 APPLIED

Data Collection, Measures of Location & Spread, Representations of Data

Curriculum Intent	<u>PURE UNIT 1: Algebraic Expressions</u> Skills/Assessment Objective Links <table><tr><th>Chapter 1: Algebraic Expressions</th></tr><tr><td>T P1 I can multiply and divide integer powers</td></tr><tr><td>T P2 I can expand a single term over brackets and collect like terms</td></tr><tr><td>T P3 I can expand the product of two or three expressions</td></tr><tr><td>T P4 I can factorise linear, Quadratic and simple cubic expressions</td></tr><tr><td>T P5 I know and can use the laws of indices</td></tr><tr><td>T P6 I can simplify and use the rules of surds</td></tr><tr><td>T P7 I can rationalise denominators</td></tr></table> Prior knowledge <ul style="list-style-type: none">• Simplifying algebraic expressions (GCSE)• Index Laws (GCSE)• Expanding brackets (GCSE)• HCF (GCSE)• Simplifying algebraic expressions (GCSE) Learning further developed in the future in: <ul style="list-style-type: none">• Year 1 Pure Unit 2• Year 1 Pure Unit 3• Year 1 Pure Unit 5• Year 1 Pure Unit 7• Year 1 Pure Unit 8• Year 1 Pure Unit 12• Year 1 Pure Unit 13• Year 1 Pure Unit 14• Year 2 Pure Unit 1 <u>PURE UNIT 2 : Quadratics</u> Skills/Assessment Objective Links	Chapter 1: Algebraic Expressions	T P1 I can multiply and divide integer powers	T P2 I can expand a single term over brackets and collect like terms	T P3 I can expand the product of two or three expressions	T P4 I can factorise linear, Quadratic and simple cubic expressions	T P5 I know and can use the laws of indices	T P6 I can simplify and use the rules of surds	T P7 I can rationalise denominators
Chapter 1: Algebraic Expressions									
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Skills/Assessment Objective Links									
Prior Knowledge									
Current learning to be developed in the future									

Chapter 2: Quadratics**T** P8 I can solve quadratic equations using factorisation, the quadratic formula and completing the square**T** P9 I can read and use $f(x)$ notation when working with functions**T** P10 I can sketch the graph and find the turning point of a quadratic function**T** P11 I can find and interpret the discriminant of a quadratic expression**T** P12 I can use and apply models that involve quadratic functions**Prior knowledge**

- Solving Equations with unknowns on both sides, with brackets and with squares (GCSE)
- Factorising Quadratics (Y1 PURE Unit 1)
- Sketching lines and quadratic graphs, identifying axis intercepts (GCSE)
- Solving linear inequalities (GCSE)

Learning further developed in the future in:

- Year 1 Pure Unit 3
- Year 1 Pure Unit 4
- Year 1 Pure Unit 6
- Year 1 Pure Unit 7
- Year 1 Pure Unit 10

PURE UNIT 3 : *Equations and Inequalities***Skills/Assessment Objective Links****Chapter 3: Equations and Inequalities****T** P13 I can solve linear simultaneous equations using elimination or substitution**T** P14 I can solve simultaneous equations: one linear and one quadratic**T** P15 I can interpret algebraic solutions of equations graphically**T** P16 I can solve linear inequalities**T** P17 I can solve quadratic inequalities**T** P18 I can interpret inequalities graphically**T** P19 I can represent linear and quadratic inequalities graphically**Prior knowledge**

- Set Notation (GCSE)
- Simplifying expressions involving surds (Y1 PURE Unit 1)
- Identifying roots, y-intercepts and turning points of quadratics (Y1 PURE Unit 2)

Learning further developed in the future in:

- Year 1 Pure Unit 4
- Year 1 Applied Unit 9

PURE UNIT 4 : *Graphs and Transformations*

Skills/Assessment Objective Links

Chapter 4: Graphs and transformations
T P20 I can sketch cubic graphs
T P21 I can sketch quartic graphs
T P22 I can sketch reciprocal graphs of the form
T P23 I can use intersection points of graphs to solve equations
T P24 I can translate graphs
T P25 I can sketch graphs
T P26 I can transform graphs of unfamiliar functions

Prior knowledge

- Factorising quadratics (GCSE)
- Sketching quadratic functions (Y1 PURE Unit 2)
- Completing a table of values and sketching a cubic function (GCSE)
- Solve simultaneous equations (Y1 PURE Unit 3)

Learning further developed in the future in:

- Year 1 Pure Unit 9
- Year 1 Pure Unit 13
- Year 2 Pure Unit 2

APPLIED UNIT 1: *Data Collection*

Skills/Assessment Objective Links

Chapter 1: Data Collection
T S1 I understand 'population', 'sample' and 'census', and I can comment on the advantages and disadvantages of each
T S2 I understand the advantages and disadvantages of simple random sampling, systematic sampling, stratified sampling, quota sampling and opportunity sampling
T S3 I can define qualitative, quantitative, discrete and continuous data, and understand grouped data
T S4 I understand the large data set and how to collect data from it, identify types of data and calculate simple statistics

Prior knowledge

- Finding averages and range (GCSE)
- Criticise questionnaires (GCSE)
- Interpreting a table of values (GCSE)

Learning further developed in the future in:

- Year 1 Applied Unit 2

APPLIED UNIT 2: *Measures of Location and Spread*

Skills/Assessment Objective Links

Chapter 2: Measures of location and spread
T S5 I can calculate measures of central tendency such as the mean, median and mode
T S6 I can calculate measures of location such as percentiles and deciles
T S7 I can calculate measures of spread such as range, interquartile range and interpercentile range
T S8 I can calculate variance and standard deviation
T S9 I can understand and use coding

Prior knowledge

- Identifying Qualitative and Quantitative data (Y1 APPLIED Unit 1)
- Identifying Discrete and Continuous data (Y1 APPLIED Unit 1)
- Finding averages from a table of values (GCSE)

Learning further developed in the future in:

- Year 1 Applied Unit 3

APPLIED UNIT 3: Representations of Data

Skills/Assessment Objective Links

Chapter 3: Representations of data
T S10 I can identify outliers in data sets
T S11 I can draw and interpret box plots
T S12 I can draw and interpret cumulative frequency diagrams
T S13 I can draw and interpret histograms
T S14 I can compare two data sets

Prior knowledge

- Drawing a bar and pie chart (GCSE)
- Interquartile range of a list (Y1 APPLIED Unit 2)
- Calculating mean and standard deviation of a list (Y1 APPLIED Unit 2)

Learning further developed in the future in:

- Year 1 Pure Unit 4

Spiritual, moral, social, and cultural development

SMSC: Making choices, looking for patterns which may reflect the natural world, supporting and collaborating with each other, realisation that mathematics is an international language and making cultural links as we explore the history of mathematics.

PSHE/British Values: Working collaboratively, being respectful during discussion and valuing contributions made by others

Skills Builder: Key skills in numeracy used in all topic areas.

Numeracy

Focus on key skills.

Literacy

Vocabulary Tier 2: Command words displayed in the classroom and italicized/bold font used in shared resources/presentations. These are a constant focus in discussion and questioning,
Vocabulary Tier 3: Title slide in all shared resource presentations show the key vocabulary for each topic.
Reading: Underlining command words,
Writing: Modelling solutions
Oracy: Think, pair, share, discussion, verbal feedback (peer to peer), questioning, student modelling

Becoming future ready

Personal Skills: As a Mathematics student you will learn many skills: you will gain opportunities to listen to others supportively and to use questioning to develop your own understanding, you will learn how to cope with challenging questions and how to build up your resilience, you will get the chance to work on your own and with others. You will develop problem solving skills and you will learn how to break a problem down into smaller more manageable steps. You will learn how to collaborate with others when solving problems and you will learn how to articulate your solution to a problem.

Employability: Mathematical skills are invaluable in the workplace. There are many transferable skills which are much valued by employers. Specific career paths for each topic are discussed at the beginning of each unit of work.

Adaptation	<ul style="list-style-type: none"> • By progressive questioning: exploring pupils' understanding through interactive dialogue. • By outcome: different learners will produce different outcomes. • By resource: worksheets are clearly presented and accessible. • By intervention: by providing different levels of supervision and support. • By offering optional activities: In class or as homework, to extend learning.
QFT/SEND Provision	
Implementation Curriculum Delivery	See curriculum intent
Learning Outcomes (Knowledge)	
Assessment	Refer to assessment maps for formative and summative assessment opportunities.
Impact	Attainment and Progress – Refer to assessment results / data review documentation.