

Unit Overview: Algebraic Techniques								
Half- Term:	AUT 1	AUT 2	SPR 1	SPR 2	SUM 1	SUM 2	No of Lessons:	24
<p>Key Focus for Unit:</p> <p><i>What is the key knowledge being delivered? What is the intent of this unit?</i></p> <p><u>Weeks 1 to 4: Brackets, Equations & Inequalities</u></p> <p><i>Building on their understanding of equivalence from Year 7, students will explore expanding over a single bracket and factorising by taking out common factors. The higher strand will also explore expanding two binomials. All students will revisit and extend their knowledge of solving equations, now to include those with brackets and for the higher strand, with knowns on both sides. Bar models will be recommended as a tool to help students make sense of the maths. Students will also learn to solve formal inequalities for the first time, learning the meaning of a solution set and exploring the similarities and differences compared to solving equations. Emphasis is placed on both forming and solving equations rather than just looking at procedural methods of finding solutions.</i></p> <p><u>Week 5: Sequences</u></p> <p><i>This short block reinforces students' learning from the start of Year 7, extending this to look at sequences with more complex algebraic rules now that students are more familiar with a wider range of notation. The higher strand includes finding a rule from the nth term for a linear sequence, using objects and images to understand the meaning of the rule.</i></p> <p><u>Week 6: Indices</u></p> <p><i>Before exploring the ideas behind the addition and subtraction laws of indices (which will be revisited when standard form is studied next term), the groundwork is laid by making sure students are comfortable with expressions involving powers. The higher strand also looks at finding powers of powers.</i></p>								
<p>Key:</p> <p>MASTERY – The skills and knowledge we want all our students to master and recall quickly.</p> <p>SECURE – The skills and knowledge that we will need to return to regularly and interleave in order for our middle and lower attaining students to secure mastery or for which they might struggle.</p> <p>DEVELOPING – The skills and knowledge that we will use to stretch and challenge our most abled students.</p>								
<p>Brackets, Equations & Inequalities:</p> <ul style="list-style-type: none"> • How to form and use algebraic expressions • How to expand single brackets • How to expand a pair of binomials (H) • How to factorise an expression • How to form and solve equations and inequalities • How to solve an equation involving brackets • How to solve equations and inequalities with unknowns on both sides (H) • The difference between formulae, equations and identities. 		<p>Sequences:</p> <ul style="list-style-type: none"> • How to generate sequences given in words • How to describe a sequence. • How to generate sequences given a simple algebraic rule • How to find out whether a given number is in a sequence • How to generate sequence using a complex algebraic rule • How to find the rule for the nth term of a sequence(H) 			<p>Indices:</p> <ul style="list-style-type: none"> • How to add and subtract expressions with indices • How to use the addition laws of indices • How to simplify powers of powers • How to use the subtraction laws of indices 			

<p>Brackets, Equations & Inequalities:</p> <p>Scaffolding Guidance:</p> <ul style="list-style-type: none"> • Use of algebra tiles • Use of other manipulatives – bar blocks and unit blocks <p>Stretch Guidance:</p> <ul style="list-style-type: none"> • Include examples that include negatives • Try ‘show that’ problems • Create your own conjecture and convince your partner if it is always true, sometimes true or never true. 	<p>Sequences:</p> <p>Scaffolding Guidance:</p> <ul style="list-style-type: none"> • Use of times tables • Links to graphs • Diagrammatical representations <p>Stretch Guidance:</p> <ul style="list-style-type: none"> • Finding the nth term of a decreasing sequence • Finding the nth term of non-linear sequences eg 1,4,9,16 • Get students to practise generating sequences from rules involving different powers of n 	<p>Indices:</p> <p>Scaffolding Guidance:</p> <ul style="list-style-type: none"> • Start with small powers so that they can recognise the link • Write it out in full e.g. $2 \times 2 \times 2 \times 2$ • Model simplifying fractions by identifying factors <p>Stretch Guidance:</p> <ul style="list-style-type: none"> • Use negative powers • Try ‘show that’ questions • Use your knowledge of indices to create calculations that are equivalent to $1/4$.
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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 they being closed?*

BIG IDEAS:

Algebra

Powerful Knowledge:

- Forming and using algebraic expressions
- Expand single and double brackets
- Forming and solving linear equations and inequalities
- Identifying, formulae, expression, identities and equations.
- Finding the nth term of a sequence
- Using a rule in words to generate a sequence
- Using algebraic rules to generate sequences
- Describing sequences in words
- Adding and subtracting expressions with indices
- Simplifying algebraic expressions by multiplying and dividing indices.
- Exploring powers of powers
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Previous Learning:

- Like and unlike terms
- Collecting like terms
- Finding missing terms in a sequence
- Multiplying and dividing by powers of 10
- Directed numbers
- Multiplying terms

Gaps in Knowledge and Misconceptions:

- When expanding brackets not multiplying each term
- Not using the rules for operations with directed numbers
- When collecting like terms not paying attention to the sign in front
- When solving equations not using BIDMAS in the reverse
- Thinking that we can't divide a small number by a big number
- Using the laws of indices incorrectly eg $(2a)^2 = 2a^2$
- When finding the nth term, they have the rule as the constant term

Unit Assessment: <i>How will this unit be assessed?</i> <i>What is the frequency of assessments – baselines etc?</i>		
<p>How will this unit be assessed?</p> <ul style="list-style-type: none"> • Baseline Testing with EOB A or similar at start • End of Block Assessment with EOB B at end 	<p>Main Topics Covered in assessments</p> <ul style="list-style-type: none"> • Multiplying terms • Expanding brackets • Factorising expressions • Solving linear equations and inequalities • Form and solve equation • Expand double brackets • Finding the missing terms in a sequence • Generate the terms in a sequence given the nth term • Find the nth term of a linear sequence • Simplify expressions by collecting like terms • Multiplying and dividing terms with the same base 	
<p>Retrieval Practice:</p> <ul style="list-style-type: none"> • T/F Retrieval starter • Homework tasks • Formula Quiz • Timetable Quiz 	<p>Key Retrieval Topics (Interleaving):</p> <ul style="list-style-type: none"> • Operations with directed numbers • Linking sequences to straight line graph • Like and unlike terms • Multiplying and dividing by powers of 10 • Solving one step and two step equations 	
<u>Key Skills Explored</u>	<u>Vocabulary Selected for DVI</u>	<u>Links to Previous Unit</u>
<ul style="list-style-type: none"> • Multiplying terms • Expanding brackets • Factorising expressions • Solving linear equations and inequalities • Form and solve equation • Expand double brackets • Finding the missing terms in a sequence • Generate the terms in a sequence given the nth term • Find the nth term of a linear sequence • Simplify expressions by collecting like terms • Multiplying and dividing terms with the same base. 	<ul style="list-style-type: none"> • Expression • Simplify • Substitute • Coefficient • Equivalent • Term • Product • Expand • Factorise • Binomial • Quadratic • Like/unlike terms • Equation • Unknown • Inequality • Variable • Formula • Linear/non-linear • Fibonacci • Constant • Difference • Integer • Power • Index/indices/exponent • Base 	<ul style="list-style-type: none"> • Operations with directed numbers • Linking sequences to straight line graph • Like and unlike terms • Multiplying and dividing by powers of 10 • Solving one step and two step equations
<u>Links to Careers/Employability</u>	<u>How does this unit prepare students for the next unit?</u>	
<ul style="list-style-type: none"> • Design Industry • Science and research (engineer) 	<ul style="list-style-type: none"> • Working with large numbers • Working with decimals • Negative and fractional powers • Area and volume in context 	