Year 7: Algebraic Expressions Medium Term Plan

Algebraic Expressions	Algebraic Notation	Understand that a letter represents a variable. Understand the difference between an expression, equation, formula, term, function and identity.	Algebra comes from the Arabic word al-jabr which means to mend or fix broken parts or complete something. It was used in a book written in 820 AD by a Persian
	Simplifying Expressions/Collecting like terms	Simplify algebraic expressions by collecting like terms.	Magic Squares can to be used to add a problem solving and reasoning aspect if appropriate.
	Forming Expressions Worded	Form expressions from words. Function Machines.	
	Forming Expressions with Geometry	Form expressions involving angles, perimeter and area.	
	Substitution	Substitute positive and negative integers and decimals into expressions and formulae. Use varying types of formulae e.g. SDT, DMV.	Real life formulae, cross curricular links with e.g. science. Calculating BMI
	Expanding Single Brackets	Expand single brackets with a number and/or letter. Include fractions, decimals, perimeter and area.	
	Expanding and Simplifying Single Brackets	Expand and simplify when adding or subtracting two brackets.	

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	Expanding Double Brackets	Expand and simplify double brackets when the coefficient of x is 1 or greater. Include fractions, decimals, perimeter and area.	CGI of quadratic pathways

Key Knowledge/Prior Learning KS2/Retrieval and Suggested Starters

- Use simple formulae
- Generate and describe linear number sequences
- Express missing number problems algebraically
- Find pairs of numbers that satisfy an equation with two unknowns
- Enumerate possibilities of combinations of two variables.
- BIDMAS
- Sequence rules
- Calculations with missing values e.g. 100 + ? = 60 x 2
- Negative numbers

KS3 National Curriculum – what students will be practicing

- Substitute numerical values into formulae and expressions, including scientific formulae
- Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors
- Form expressions
- Simplify and manipulate algebraic expressions to maintain equivalence by:
  - collecting like terms
  - multiplying a single term over a bracket including fractions & decimals
  - taking out common factors
  - expanding products of 2 or more binomials

Specific Ambitious Knowledge

Using multiple methods to:

- Methods to expand single
  -grid
  -partitioning
- Methods of expanding double brackets
  -FOIL,
  -grid,
  -distributive law,
  -column method
  Methods to factorise (factor tables, grids, partitioning etc).

Key Vocabulary/Literacy Opportunities

- Integer
- Expressions
- Formulae
- Substitute

- Expand
- Simplify
- Factorise
- Coefficient
- Identity
- Quadratic

Key Formulae/Knowledge

- x X x = x^2
- $2a^5$ x $4a^3$ – multiply the coefficients and add the indices
- - x - = +
- + x - = -

Cross Curricular Links

- Scientific Formulae - substitution e.g. velocity and acceleration
- Students to practice substitution using key and common formula from science and other subject areas, where applicable.

Student' Thinking

Projects/Enrichment/Investigations

- Number square problems https://nrich.maths.org/2821
- Perimeter expressions: https://nrich.maths.org/perimeterexpressions
- The simple life: https://nrich.maths.org/13207
- Algebraic magic square: https://www.stem.org.uk/resources/elibrary/resource/35898/algebra-magic-square#&gid=undefined&pid=1
- Algebraic magic squares - power point
- Calculating BMI investigations

Projects:
Core:
Upper:
Set 1: