



Big Question - Algebra

AoLE: Mathematics and Numeracy	Subject: Maths	Year: 8
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Big Question / Aim / Objective / Concept	Vision (Proposed outcome) / Purpose of curriculum	Prior knowledge / Learners previous knowledge
Why is x not always worth 24?	Pupils will explore sequences that contain an algebraic rule. Pupils will realise algebra is a branch of mathematics that uses symbols and letters to represent quantities and their relationships, allowing for the study and manipulation of mathematical expressions and equations. Pupils will explore the formation and manipulation of expressions. Pupils will finally explore solving equations and applying formulae.	Multiplication Division Addition Subtraction Fractions Sequences Directed number

What does progression look like in this 'Big Question'?

Progression Indicator	Description of learning (What matters statements)	Student evidence of progression / Knowledge
Excelling	<p>I can demonstrate my understanding of concepts such as a variable, using algebraic notation to form linear expressions, equations and inequalities.</p> <p>I can manipulate algebraic expressions fluently by simplifying, expanding, substituting and factorising by extracting a common factor.</p> <p>I can explore and use efficient methods of solving equations and inequalities in the first degree.</p> <p>I can use equations and inequalities in the first degree to represent and model real-life situations and solve problems, using a range of representations.</p> <p>I can explore, generate, identify and represent both numerical and spatial patterns, using linear and non-linear sequences.</p> <p>I can apply this knowledge to rearrange formulae where the subject appears in more than one term.</p> <p>I can investigate a variety of non-linear graphs, including quadratic, cubic and reciprocal, to develop an understanding of the effect of the coefficients and constants on the shape of the graph.</p>	<p>Calculate expanding single brackets and simplifying.</p> <p>Calculate expanding a pair of binomials</p> <p>Solve equations, including brackets.</p> <p>Form and solve equations with brackets.</p> <p>Calculate the rule for the nth term of a linear sequence.</p> <p>Calculate rearranging formulae that includes the subject appearing more than once.</p> <p>Explore a range of graphs and the impact of coefficients and constraints.</p> <p>Generate linear and non-linear sequences.</p>
Advancing	<p>I can explore, generate, identify and represent both numerical and spatial linear sequences, including finding and using a general term.</p> <p>I can use commutativity, distributivity and associativity to explore equality and inequality of expressions.</p> <p>I can demonstrate an understanding of the idea of input, application of a rule (including inverse operations) and output, using a function machine or other appropriate methods, and I have applied this idea to solve problems.</p>	<p>Solve algebraic calculations that include directed number.</p> <p>Solve simple inequalities.</p> <p>Classify formulae, expressions, identities and equations.</p> <p>Form algebraic simple expressions with more than one unknown.</p> <p>Generate sequences given a simple algebraic rule.</p>



	<p>I can interpret algebraic expressions because I understand the way symbols are used to represent operations, multiples and powers.</p> <p>I can model problems, using expressions and equations involving symbols or words to represent unknown values, adopting the conventions of algebra.</p> <p>I can use inverse operations to find unknown values in simple equations.</p>	<p>Expand and factorise single brackets.</p> <p>Solve simple equations.</p>
Securing	<p>I can demonstrate an understanding of the idea of input, application of a rule and output using a function machine.</p> <p>I can explain numerical sequences and spatial patterns in words and by generalising them.</p> <p>I can model problems, using expressions and equations involving symbols or words to represent unknown values, adopting the conventions of algebra.</p>	<p>Calculate outputs from a function machine, following a rule.</p> <p>Explore numerical and spatial patterns.</p> <p>Generate a geometric sequence given a rule.</p> <p>Generate an arithmetic sequence using a simple algebraic rule.</p> <p>Generate algebraic expressions.</p> <p>Form algebraic simple expressions with one unknown.</p>
Beginning	<p>I am beginning to recognise, copy, extend and generalise patterns and sequences around me.</p> <p>I am beginning to demonstrate, using objects, an understanding of the concepts of 'equal' and 'not equal'.</p> <p>I can use the equals sign to indicate that both sides of a number sentence have the same value.</p> <p>I can use inequality signs when comparing quantities to indicate 'more than' and 'less than'.</p> <p>I have explored patterns of numbers and shape. I can recognise, copy and generate sequences of numbers and visual patterns.</p> <p>I can explore and create patterns of numbers and shapes.</p>	<p>Generate an arithmetic sequence given a rule.</p> <p>Extending a sequence.</p> <p>Demonstrate the concept of equal to and not equal to.</p> <p>Explore more than, less than symbols.</p>

Authentic learning experiences (Local / National / International)	Skills (Literacy / Numeracy / DCF) / Cross Curricular links
<p>Local links: Design an algebraic expression to model how increasing the number of students will impact on the school budget.</p> <p>National links: Use a simple algebraic model to explore how different proportions of sheep and cattle affect agricultural output of Welsh farmers.</p> <p>International links: Algebra is used in a range of industries such as engineering, which relies upon a range of formulae which have been developed through product testing.</p>	<p>Cross-curricular Links: Science uses a range of formulae. PE uses formulae when calculating different measurements such as speed.</p> <p>DCF: Cross curricular project incorporating numerous DCF skills embedded at the end of Summer term.</p> <p>Literacy: Frayer models and key word spelling tests will assist learners with tier 3 vocabulary. Reasoning and logic will be tested using additional constraints and higher order questioning.</p>



Equations are an essential part of cosmology when attempting to explain the evolution of the universe.	
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Assessment (How will we know that students have learnt what we taught them?)	
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Formative assessment: Teacher circulating Cold calling Mini whiteboards Peer/self assessment tasks Pickers Mathswatch Desmos	Summative assessment: Open book assessment covering all topics.
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Evaluation Evaluation (To be completed July 2024)		
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Strengths	Areas for Development	Pupil Voice