Patterns and expressions
Overview of unit

Investigation	Key Mathematical Ideas	Key Technology Experiences
Introduction Welcome to the English Light Orchestra (10 minutes)	→Establish the context for the unit.	No technology needed.
Investigation 1 Playing with Patterns (80 minutes)	→Figural patterns have repeating structures that can be described using mathematics. →Pupils are helped to generalise by examining the structure of figural patterns. →Pupils calculate the value of the number of lights for a given or 'fixed' numerical value and then make this into a variable by 'unlocking the box' containing the fixed value.	Drag 'lights' onto the Designer's Grid to build a 'block'. Define a 'pattern'. Create a numeric expression in the Expression Builder. Unlock the 'No' of blocks' to create a variable. Build an 'expression for the 'total number of lights' in the pattern. Create Graph/Table snapshots.
Investigation 2 Some Lights are Always On (55 minutes)	→An unlocked number, or variable, represents the figure number. A figure number is the index for the stage of the pattern displayed. →An expression can have multiple terms using the same variable. →A part of the pattern that does not repeat is represented by a constant; it is added or subtracted in the expression, and does not get multiplied by a variable.	As in Investigation 1 *and* Having created two patterns of lights, 'link' the variables by giving them both the same name.
Investigation 3 Different but the Same (55 minutes)	→The total number of lights required to make one pattern can be represented by two different expressions, which are equivalent, for example: 3n + 4n yields the same number of lights as 7n, for any n. →The structure of the pattern can be used to explain why two	As in Investigation 2 *and* Having created two patterns of lights, 'link' the variables by giving them both the same name. Transforming 'linked' variables to adjust an

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	expressions are equivalent. → Tables and/or graphs can be used to demonstrate (but not prove) equivalency or non-equivalency.	algebraic model for more than one algebraic model for the same figural pattern.
Investigation 4 It's OK to Be Negative (65 minutes)	→ The additive inverse function is a way of representing subtraction of terms in patterns. → Equivalent expressions can be created using additive inverses.	Use the 'negative light' to represent switching a light off.
Collaborations 4.1 and 4.2 (15 minutes)	→ Equivalent expressions can be justified by colouring the same pattern in different ways.	
Investigation 5 Your Lighting Design (55 minutes)	→ Equivalent expressions (including negative terms) can be justified by colouring the same pattern in different ways.	Depending on students' ability, the technology skills developed in Investigations 1, 2, 3 and 4 will be sufficient.
Collaborations 5.1 and 5.2 (15 minutes)	→ Equivalent expressions (including negative terms) can be justified by colouring the same pattern in different ways.	