- Understand that substituting particular values into a generalised algebraic statement gives a sense of how the value of the expression changes.

Simplify algebraic expressions by collecting like terms to maintain equivalence

Students should see the process of *'collecting like terms'* as essentially about adding things of the same unit. Younger students are often excited by the fact that calculations such as 3 000 000 + 2 000 000 are as easy as 3 + 2. Later, they realise that the same process is at work with equivalent fractions, such as $\frac{3}{7}+\frac{2}{7}=\frac{5}{7}$. Students begin to generalise this to 3 (of any number) + 2 (of the same number), and finally to symbolise this as 3*a* + 2*a*.

Avoid teaching approaches that are solely procedural and do not allow students to understand the idea of unitising and the important principle that letters stand for numbers and not objects. For example, to teach that 3*a* + 2*a* = 5*a* because 'three apples plus two apples equals five apples' is incorrect and this approach (often termed 'fruit salad algebra') should be avoided.

Students should fully appreciate that collecting like terms is not a new idea but a generalisation of something they have previously experienced when unitising in number. They should understand what like terms are and are not, and experience a wide range of standard and non-standard examples (for example, constant terms, terms containing products, indices, fractional terms). Students should come to realise that, when they are simplifying algebraic expressions such as 2*xy* + 5*xy* as 7*xy*, they have obtained an equivalent expression (i.e. one with exactly the same value even though it has a different appearance).

Key ideas

- Identify like terms in an expression, generalising an understanding of unitising
- Simplify expressions by collecting like terms

Manipulate algebraic expressions using the distributive law to maintain equivalence

Students will have learnt at Key Stage 2 that to calculate an expression such as 3 × 48 they can think of it as 3 × (40 + 8), which equals 3 × 40 + 3 × 8. Students may know this as the distributive law, although this should not be assumed. What is important at Key Stage 3 is that students come to see this as a general structure that will hold true for all numbers. They should be able to express this general structure symbolically (i.e. 3(*a* + *b*) = 3*a* + 3*b*) and pictorially by using, for example, an area model: