Tutor notes for Module 5: Algebraic skills

Module 5: Algebraic skills, Section A, Challenge 1

Challenge title	Sequences
Challenge	Use matchsticks to make **five** different sequences of shape patterns, with **at least four** patterns in each sequence. Turn each sequence into a number pattern. Describe the patterns and the sequence using words, then write formulae for each sequence. Test your formula by extending your sequences.
Aim	• To develop an understanding of sequences • To practise the skills required to work with nth term formulae • To improve all round algebraic and number skills

Challenge ref.	5A1	**Session time**	approx. 2 hours
Skills	Algebraic manipulation; Reasoning; Spotting patterns; Understanding relationships; Using formulae; Writing formulae and equations.		

Suggested approach

The sequences that students produce here need to be linear (ie sequences that go up or down by the same amount each time). If students design patterns where the difference between terms changes each time, it will be a lot more difficult to produce an nth term formula. The **nth formula helpsheet** can be used to support this part of the challenge.

Students need to explain their reasoning and methods as they work through the solution and show this in their final written work. The reasoning needs to be precise and concise, clearly showing where the formulae come from.

Generating sequences (example)

Students need to be producing the nth term formula and it may be useful for them to generate a sequence using these formulae first.

nth term = 2n + 1:

- n = 1 $2n + 1 = 2 \times 1 + 1 = 3$
- n = 2 $2n + 1 = 2 \times 2 + 1 = 5$
- n = 3 $2n + 1 = 2 \times 3 + 1 = 7$
- n = 4 $2n + 1 = 2 \times 4 + 1 = 9$

Finding the nth term formula (example)

An outline of how to find the nth term of a sequence is provided here. This is a generic method, but some students may be able to jump straight to a formula without going through this process. Many students will confuse these formulae with a rule that links terms together, this must be corrected as the nth term formula generation is a different skill.

Sequence = 5, 8, 11, 14

- Difference between each term = 3
- Number before the sequence starts = 2
- nth term formula = 3n + 2

Suggested resources

The following learner resources are provided for this challenge:

- Challenge walkthrough 5A1
- Nth formula helpsheet
- Sequences (p.92–94 of the learner workbook only)