

Investigation – the staircase pattern

MODULE 8 · ALGEBRA – PATTERNS, EXPRESSIONS AND EQUATIONS

ALGEBRA

HOW TO ANSWER TODAY

- **Find the rule.** Look at how each input changes to its output. Try $\times$ first, then $+$ or $-$.

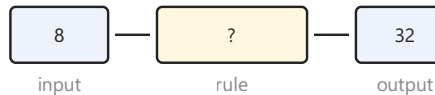
$3 \rightarrow 6$, $5 \rightarrow 10$, $7 \rightarrow 14 \rightarrow$ rule is $\times 2$

- **Function machine.** Do EACH step of the rule in order to the input.

Rule $\times 4 + 2$, input $5 \rightarrow 5 \times 4 = 20$, $+ 2 = 22$

★ STRETCH PROBLEMS

1



Mr Ó Broin is in the photocopier room getting worksheet packs ready for tomorrow. For each pupil, he prints a set number of sheets and then adds the same number of extra cover sheets to the pile. The pile sizes go $8 \rightarrow 32$, $3 \rightarrow 17$ and $7 \rightarrow 29$ pupils to total sheets. What is the rule that turns the number of pupils into the total number of sheets?

2

Cian saves his pocket money in a jar. Each week he counts what is left and writes the amount in his copy: €14, €11, €8, €5. If the pattern continues, how much will be in the jar next week?

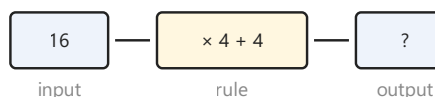
What comes next in the sequence: 14, 11, 8, 5, ___?

3

Oisín brings a bag of bread to the pond in Wicklow to feed the ducks. After feeding them for 1 minute he has 14 pieces left, after 2 minutes he has 9 pieces, after 3 minutes he has 4 pieces, and after 4 minutes he has -1 pieces (he had to borrow one from his sister). Following the same pattern, how many pieces will he have after 5 minutes?

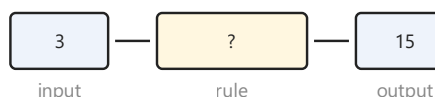
What comes next in the sequence: 14, 9, 4, -1, ___?

4



At break time, Tadhg shares biscuits using a rule: multiply the number of pupils by 4, then add 4 extra biscuits for the teachers. If 16 pupils are in the group today, how many biscuits does he need in total?

5



Granny pays Niamh pocket money for helping with the calves at the farm. She uses a rule based on the number of calves Niamh feeds: 3 calves earns €15, 9 calves earns €33, and 10 calves earns €36. What is the rule?