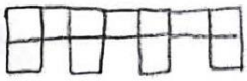
Stage 4 Mathematics student work sample – Grade A

Tunnel Patterns

These 'tunnels' have been constructed using centicubes. The diagrams represent the construction of 1 tunnel and 2 tunnels.

1 tunnel 2 tunnels

1. Using centicubes, construct the structure for 3 tunnels. Draw the diagram representing the construction of 3 tunnels.



Draws an appropriate diagram and completes a table of values that demonstrates understanding of the problem

2. Complete the table:

Number of tunnels (T)	1	2	3	4	5
Number of centicubes (C)	5	8	11	14	17

3. How many centicubes are required to construct 20 tunnels? Write the rule used for this calculation, using words or algebraic symbols. Explain how you obtained this rule.

Rule – $2 + 3T = C$

I worked out that it was adding 3 centicubes each time but we began with 2 centicubes so therefore it was $2 + 3T = C$.

$2 + 3 \times 20 = 62$

62 centicubes were required

Generalises the pattern using given pronumerals to obtain a rule that relates the number of centicubes to the number of tunnels and clearly explains how the rule was formulated

Applies the rule to solve the problem efficiently

Grade Commentary

Ariel demonstrates sound understanding of geometric patterns and the ability to make generalisations. A clear explanation of the formulation of the rule is provided and the rule is applied to solve a problem efficiently.

Ariel's response demonstrates characteristics of work typically produced by a student performing at a grade A standard.