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

2. Complete the table:

<table>
<thead>
<tr>
<th>Number of tunnels (T)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of centicubes (C)</td>
<td>5</td>
<td>8</td>
<td>11</td>
<td>14</td>
<td>17</td>
</tr>
</tbody>
</table>

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.

\[ \text{Rule: } 2 + 3T = C \]

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

**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.