Stage 4 Mathematics student work sample – Grade C

**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.

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.

62 centicubes to construct 20 tunnels.

1T = 5, to keep going add 3

1T + 3C

I got this because 1 tunnel is 5 cubes to keep getting more you add 3.

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

**Determines the number of centicubes required for 20 tunnels**

**Provides a rule that relates the number of centicubes required to the number of centicubes used for the previous structure**

**Explains how the rule was determined**

**Grade Commentary**

Mel demonstrates some understanding of geometric patterns. The formulation and application of a rule that relates the number of centicubes to the number of tunnels using an appropriate algebraic expression for the rule would enhance the response.

Mel’s response demonstrates characteristics of work typically produced by a student performing at a grade C standard.