

Tables for Küchemann, D. & Hoyles, C. (2009) From empirical to structural reasoning in mathematics: tracking changes over time In Stylianou, D.A, Blanton, M. L. & Knuth, E.J. (Eds) *Teaching and Learning Proof Across the Grades K-16 Perspective* Lawrence Erlbaum Associates pp171- 191

CODES	Yr 8		Yr 9		Yr 10	
	Number	% of sample	Number	% of sample	Number	% of sample
<b>Incorrect answer</b>						
Miscellaneous non-correct, including no response	163	11	67	4	66	4
<b>Code 1:</b> Spotting number patterns	522	35	317	21	315	21
<b>Code 2:</b> Some recognition of structure	112	7	105	7	75	5
<b>Total incorrect</b>	<b>797</b>	<b>53</b>	<b>489</b>	<b>32</b>	<b>456</b>	<b>30</b>
<b>Correct answer</b>						
<b>Code 3:</b> Correct structure, specific	527	35	572	38	615	41
<b>Code 4:</b> Correct structure, general	53	4	214	14	43	3
<b>Code 5:</b> Correct structure, use of variables	135	9	237	16	398	26
<b>Total correct</b>	<b>715</b>	<b>48</b>	<b>1023</b>	<b>68</b>	<b>1056</b>	<b>70</b>
<b>Total</b>	<b>1512</b>	<b>100</b>	<b>1512</b>	<b>100</b>	<b>1512</b>	<b>100</b>

**Table 1:** Code frequencies for item A1a for Yrs 8, 9 and 10 (N=1512)

	Yr 10 A1a									
	Code 1		Code 2		Code 3, 4 or 5		Misc.		Total	
Yr 8 A1a	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Code 1</b>	184	12	27	2	283	19	28	2	<b>522</b>	<b>35</b>
<b>Code 2</b>	26	2	9	1	72	5	5	0	<b>112</b>	<b>7</b>
<b>Code 3, 4 or 5</b>	57	4	29	2	612	40	14	1	<b>715</b>	<b>47</b>
<b>Miscellaneous</b>	48	3	10	1	89	6	16	1	<b>163</b>	<b>11</b>
<b>Total</b>	<b>315</b>	<b>21</b>	<b>75</b>	<b>5</b>	<b>1056</b>	<b>70</b>	<b>66</b>	<b>4</b>	<b>1512</b>	<b>100</b>

**Table 2a** Yr 8 by Yr 10 code frequencies for A1a with the code 3, 4 and 5 responses combined (N=1512)

Number	%
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<b>Total</b>	<b>1512</b>	<b>100</b>
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Table 2b Yr 8 by Yr 10 progress for A1 part a with the code 3, 4 and 5 responses combined (N=1512)

<b>Yr 8</b>	<b>Yr 9</b>
<b>A4a:</b> “Yes”; calculates $120 \div 3$	<b>A4a:</b> “Yes. The number has been multiplied by 3, so it must be divisible by 3”
<b>A4c:</b> Leaves blank	<b>A4c:</b> “Yes. The number has been multiplied by 19, so it must be divisible by 19”

**Table 3:** Summary of student AM’s responses to A4a and A4c in Yr 8 and Yr 9