Dot Patterns   *M007 scoring rubric*

Math Domain

☐ Number/Quantity	☐ Shape/Space	☑ Function/Pattern
☐ Chance/Data	☑ Arrangement	

Math Actions (possible weights: 0 through 4)

3 Modeling/Formulating	1 Manipulating/Transforming
3 Inferring/Drawing Conclusions	3 Communicating

Math Big Ideas

☐ Scale	☐ Reference Frame	☑ Representation
☐ Continuity	☐ Boundedness	☐ Invariance/Symmetry
☐ Equivalence	☐ General/Particular	☐ Contradiction
☐ Use of Limits	☐ Approximation	☐ Other

Picture Number	Number of dots added	Total number of dots
1		4
2	5	9
3	7	16
4	9	25
100	201	10,000
101	203	10,201

2. You would need to add 203 sticks. Most students will arrive at this by looking at the number added to get each successive picture, namely two times the picture number plus one.

3. The pattern of the total number of dots as a function of the picture number may be described by saying that the number of dots is equal to the square of one more than the picture number: number of dots = $(n + 1)^2$.

4. Using this generalized formula, there will be 10, 201 sticks in picture number 100.

	partial level (1 or 2)	full level (3)
Modeling/ Formulating (weight: 3)	Student develops a strategy to formulate the pattern made by the dot arrays, but it is not sufficient to answer question **2**.	Student has a well developed strategy to formulate the pattern made by the dot arrays, and is able to answer question **2** without calculating each case.
Transforming/ Manipulating (weight: 1)	Some of the answers to question **1** and the table are correct.	All of the answers to question **1** and the table are correct.
Inferring/ Drawing Conclusions (weight: 3)	Student shows evidence of trying to incorporate answers from questions **1** and **2**, but is not able to arrive at a correct answer to question **3**, or The answer to question **4** is not consistent with the expression generated in question **3**.	The generalized expression for the pattern is valid, and is applied correctly in answering question **4**.
Communicating (weight: 3)	Explanations for questions **2**, **3** and **4** are not totally clear or complete.	Explanation for questions **2**, **3** and **4** are appropriate to the question, clear, and complete.