Anchor Paper Scoring and Rationales – Task: <u>How Many Stones Will I Need?</u>

<u>Name: Student A</u>

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Proficient	This student demonstrates an understanding of how to look at a number pattern and create an algebraic expression to represent the pattern. This student also simplifies and evaluates the expression created to produce a valid and correct solution.
Problem Solving	Proficient	Student A relates the number of stones needed to the perimeter of a rectangle. After distributing, this student codes like terms using circles and squares. The student produces a solution relevant to the problem. There is no confirmation of the reasonableness of the solution, but the problem solving strategies do display an understanding of the underlying mathematical concepts.
Communication and Reasoning	Developing	Limited evidence is provided by Student A to support explanations for how the three algebraic expressions created relate to the gardens. The student provides no explanation in response to the question regarding whether the solution for the number of stones needed for a garden of size 100 makes sense. There is little mathematical language provided.
Representations and Connections	Proficient	This student represents the problem accurately and connects the numerical values with appropriate algebraic expressions. The student connects the three representations with the idea of perimeter and the adjustments made in relation to the gardens presented in the task.

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<u>Name: Student B</u>

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Proficient	Although this student is quick to jump to the simplified expression, 4n + 6, by simply looking at number patterns, the student circles back around to an equivalent expression, 2n + 2(n+ 1) + 4 once asked to relate the expressions to the garden. As a result, the student does demonstrate an understanding of creating, simplifying, and evaluating algebraic expressions and reaches a valid and correct solution.
Problem Solving	Advanced	This student is very efficient in problem solving. The simplified algebraic expression is this student's original response to the total number of stones needed. The student quickly jumps to another efficient strategy by visualizing the gardens as squares with 6 extra stones, 2 on the length and 4 in the corners.
Communication and Reasoning	Advanced	Student B uses precise mathematical vocabulary, symbolic notation, and visual images to support the argument for why the simplified algebraic expression, 4n + 6, makes sense. The student's communication and reasoning is organized and coherent.
Representations and Connections	Advanced	Accurately labelled models are provided in this student's response to the task. The student uses these models to demonstrate the connection between the mathematics and the context of the task. These models help to provide evidence that this student has a deep understanding of the content.

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Name: Student C

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Developing	Student C demonstrates a partial understanding of the concepts and skills associated with this task. The majority of the work is accurate; however, this student does not identify constants as terms that should be combined when writing an algebraic expression in simplest form. Therefore, the solution is not entirely correct.
Problem Solving	Proficient	This student demonstrates a problem solving strategy that displays an understanding of the underlying mathematics. Although a completely simplified algebraic expression is not shown, a solution relevant to the problem is evident. The student confirms that the expression recorded for the number of stones needed is reasonable.
Communication and Reasoning	Developing	Developing is the best description for this student's communication and reasoning. There is a limited use of mathematical language, and the student does not finish communicating thoughts in all areas.
Representations and Connections	Proficient	Student C connects the task to the concept of perimeter of a rectangle. The student labels like terms within the bracketed portion of the expression accurately with circles and squares. Although the student does not seem to realize that the "- 4" is also a part of the algebraic expression that can be simplified, the student's representation does help exploration and modeling of the problem.

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Name: Student D

	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Developing	Student D demonstrates a partial understanding of the concepts and skills associated with this task. The student accurately writes an algebraic expression to represent data; however, is unable to simplify expression accurately. When asked to evaluate an expression, this student comes to a valid solution, but it is not the result of evaluating any algebraic expressions previously recorded.
Problem Solving	Proficient	Proficient describes this student in the area of problem solving. The student develops a strategy that relates to the perimeter of a rectangle. Although the algebraic expressions are not simplified accurately, Student D does produce a solution relevant to the task.
Communication and Reasoning	Emerging	This student uses little or no mathematical language to communicate thinking. Each part of the task is approached as “something different” which makes it difficult to follow the thinking process.
Representations and Connections	Developing	Student D makes a partial mathematical connection. The student’s original algebraic expression for the number of stones needed resembles the work shown to evaluate for a garden of size 100. The student seem to use the Distributive Property (in reverse) to add “n+3” and “n+2” before doubling the sum instead of doubling each before finding the sum.

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<u>Name: Student E</u>

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Developing	This student has a partial understanding of the concepts and skills associated with the task. The student accurately writes and simplifies algebraic expressions. However, the student's evaluation in part 4 is not related to any of the expressions previously recorded and does not produce a correct solution. Therefore, their solution is partially incorrect.
Problem Solving	Developing	Student E works through the problem presented but does not seem to have an awareness about the reasonableness of the solutions. All of the problem solving strategies applied in the first three parts of the task are discarded when the fourth part is evaluated.
Communication and Reasoning	Developing	This student provides inconsistent evidence to support arguments and claims. The student explains how the algebraic expressions for number of stones wide and number of stones long relate to the gardens, but avoids communicating the logic for the expression for the number of stones needed.
Representations and Connections	Developing	Student E makes a partial mathematical connection. The student accurately connects expressions with their simplified forms. However, the student does not extend this connection when asked to evaluate for a large garden of size 100. Modeling, beyond that provided, is not evident.

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Name: Student F

Criteria	Performance Level (Advanced, Proficient, Developing, Emerging)	Rationale
Mathematical Understanding	Developing	This student demonstrates a partial understanding of the concepts and skills associated with the task. Although the expressions are written and simplified correctly, the evaluation of the number of stones needed for a garden of size 100 is inaccurate. Therefore, a portion of the solution is incorrect.
Problem Solving	Developing	Problem solving is described as developing for Student F. This student produces a solution that is relevant to the context of the task, but the student does not confirm the reasonableness of the solution. The student's claim that a garden of size 100 would need 402 tiles does not match the value that would be produced by evaluating the expression 4n + 6 for n = 100.
Communication and Reasoning	Developing	Student F shows limited reasoning and justification for solution steps. The student's original algebraic expression for the number of stones needed jumps directly to the simplified form, without any explanation or work shown regarding how the transformation occurred.
Representations and Connections	Proficient	This student uses the concept of perimeter to develop accurate algebraic expressions for the table provided. The student has shaded in the corners of the models provided to show the parts of the expression for the number of stones needed (n's on the sides, (n+1)'s on the top and bottom, 4 corner stones).