Task Model 1

Response Type:
Fill-in Table

DOK Level 2

4.OA.C.5
Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Evidence Required:
1. The student generates number patterns.

Tools: None

Prompt Features: The student is prompted to generate up to five terms of a number pattern.

Stimulus Guidelines:

- Pattern rules fit the form of "[basic operation] [number]" (e.g., "add 2," "multiply by 3").
- Item difficulty can be adjusted via these example methods:
  - Addition or subtraction patterns involving whole numbers
  - Addition or subtraction patterns involving fractions
  - Multiplication or division patterns involving whole numbers
  - Multiplication patterns involving fractions (multiplying a fraction by a whole number)

TM1
Stimulus: The student is presented with a number pattern rule and starting number.

Example Stem: A pattern is generated using this rule: Start with the number 7 as the first term and add 5.

Enter numbers into the boxes to complete the table.

Term	Number
First	7
Second	
Third	
Fourth	
Fifth	

Rubric: (1 point) The student enters the correct numbers (e.g., 12, 17, 22, 27).

Response Type: Fill-in Table

Task Model 2a

Response Type: Matching Tables

DOK Level 2

4.OA.C.5
Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Evidence Required:
2. The student generates shape patterns.

Tools: None

Prompt Features: The student is prompted to identify up to six terms of a shape pattern.

Stimulus Guidelines:

- Item difficulty can be adjusted via these example methods:
  - A simple repetitive shape pattern involving no more than four shapes
  - Shapes that grow, diminish, or rotate
  - A combination shape/number pattern involving a shape rule (as described above) and a number rule (as described in TM1)

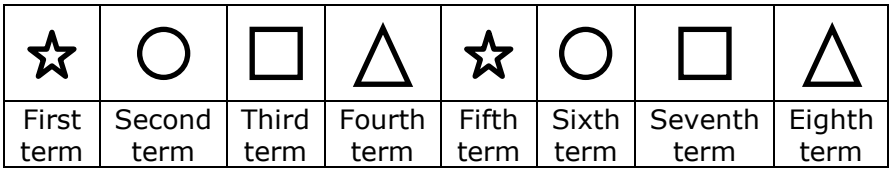
TM2a
Stimulus: The student is presented with a shape pattern rule.

Example Stem: A shape pattern is generated by repeating the pattern of "Star, Circle, Circle."
Click in the table to show the first six terms of the pattern, starting with Star.

	Star	Circle
First term		
Second term		
Third term		
Fourth term		
Fifth term		
Sixth term		

Rubric: (1 point) The student correctly identifies the first six terms of the pattern (e.g., Star, Circle, Circle, Star, Circle, Circle).

Response Type: Matching Tables

Task Model 2b **Response Type: Multiple choice, single correct response** **DOK Level 2** **4.OA.C.5** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.* **Evidence Required:** 2. The student generates shape patterns. **Tools:** None	**Prompt Features:** The student is prompted to identify a specific term of a shape pattern. **Stimulus Guidelines:** Same as for TM2a. **TM2b** **Stimulus:** The student is presented with a shape pattern rule. **Example Stem:** A shape pattern is generated by repeating the pattern of "Star, Circle, Square, Triangle" as shown.  This pattern continues for 100 terms. Select the shape that represents the 98th term. A. B. C. D. **Rubric:** (1 point) The student correctly identifies the indicated term (e.g., B). **Response Type:** Multiple Choice, single correct response

Task Model 3a-b

Response Type: Matching Tables

DOK Level 3

4.OA.C.5
Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Evidence Required:
3. The student analyzes a number pattern or shape pattern, showing understanding of the pattern rule and features other than the pattern rule.

Tools: None

Prompt Features: The student is prompted to identify features of a number pattern.

Stimulus Guidelines:

- Pattern rules should fit the form of "[*basic operation*] [*number*]" (e.g., "add 2," "multiply by 3").
- Item difficulty can be adjusted via this example method:
  - Whether the answer choice statements refer to terms in general or to specific terms
- Items should be equally distributed across these types:
  - Addition or subtraction patterns involving whole numbers
  - Addition or subtraction patterns involving fractions
  - Multiplication or division patterns involving whole numbers
  - Multiplication patterns involving fractions (multiplying a fraction by a whole number)

TM3a
Stimulus: The student is presented with a number pattern rule and starting number.

Example Stem: A pattern is generated using this rule: Start with the number 5 as the first term and add 2.
Select True or False for each statement about the pattern.

	True	False
The terms alternate between even and odd numbers.		
Each term is greater than the term before it.		
All possible multiples of 5 are terms in the pattern.		

Rubric: (1 point) The student correctly identifies all three statements as True or False (e.g., F, T, F).

Response Type: Matching Tables

Task Model 3a-b

Response Type: Matching Tables

DOK Level 3

4.OA.C.5
Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Evidence Required:
3. The student analyzes a number pattern or shape pattern, showing understanding of the pattern rule and features other than the pattern rule.

Tools: None

Version 3 Update:
Edited TM3b to show four terms of the pattern and changed the questions in the table.

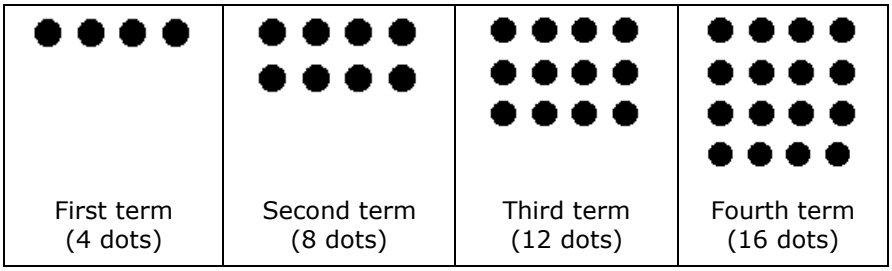
Prompt Features: The student is prompted to identify features of a shape pattern.

Stimulus Guidelines:

- Statements describe features of the pattern, not the rule of the pattern.
- True statements will name a strategy that can be used to find the *n*th term that is *not* a direct application of the rule itself.
- Item difficulty can be adjusted via this example method:
  - Whether the answer choice statements refer to terms in general or to specific terms
- Items should be equally distributed across these types:
  - Simple repetitive shape pattern involving no more than three shapes
  - Shapes that grow, diminish, or rotate
  - A combination shape/number pattern involving a shape rule (as described above) and a number rule (as described in TM3a)

TM3b
Stimulus: The student is presented with a shape pattern rule.

Example Stem: The first four terms of a shape pattern are shown. Each term is generated by following the same rule.



First term (4 dots)	Second term (8 dots)	Third term (12 dots)	Fourth term (16 dots)

Decide whether each statement can be used to describe the dot pattern shown. Select Yes or No for each statement.

	Yes	No
The difference between the number of dots in each term is 8.		
The number of dots in the 7^{th} term is 28.		
The digit in the ones place of the number of dots repeats in the following pattern: 4, 8, 2, 6, 0.		

Rubric: (1 point) The student correctly selects yes or no for each method (e.g., N, Y, Y).

Response Type: Matching Tables

Task Model 3c **Response Type: Equation/Numeric** **DOK Level 3** **4.OA.C.5** Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.* **Evidence Required:** 3. The student analyzes a number pattern or shape pattern, showing understanding of the pattern rule and features other than the pattern rule. **Tools:** None	**Prompt Features:** The student is prompted to analyze features of a number pattern. **Stimulus Guidelines:** • All items are limited to addition or multiplication of whole numbers only. • Item difficulty can be adjusted via this example method: ○ Whether the student is prompted to consider the pattern's terms in general or specific terms in the pattern • Number pattern rules fit the form of "[*basic operation*] [*number*]" (e.g., "add 2," "multiply by 3"). **TM3c** **Stimulus:** The student is presented with a rule and starting number. **Example Stem:** A pattern is generated using this rule: Start with 42 and add 5. Enter one number in each response box that makes this sentence correct: The ones digit for every term in the pattern is either ___ or ___. **Rubric:** (1 point) The student correctly names the values between which the identified place's digits alternate (e.g., 2, 7). **Response Type:** Equation/Numeric (2 response boxes)

Task Model 3d

Response Types: Drag and Drop; Hot Spot

DOK Level 3

4.OA.C.5
Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Evidence Required:
3. The student analyzes a number pattern or shape pattern, showing understanding of the pattern rule and features other than the pattern rule.

Tools: None

Accessibility Note:
Drag and Drop and Hot Spot items are not currently able to be Brailled. Minimize the number of items developed to this TM.

Prompt Features: The student is prompted to analyze features of a number pattern.

Stimulus Guidelines:

- All items are limited to addition or multiplication of whole numbers only.
- Item difficulty can be adjusted via this example method:
  - Whether the student is prompted to consider the pattern's terms in general or specific terms in the pattern
- Number pattern rules fit the form of "[*basic operation*] [*number*]" (e.g., "add 2," "multiply by 3").

TM3d
Stimulus: The student is presented with a rule and starting number.

Example Stem: A pattern is generated using this rule: Start with the number 7 as the first term and add 5.

Part A: Drag numbers into the boxes to show the next six terms of this pattern.

7						
First term	Second term	Third term	Fourth term	Fifth term	Sixth term	Seventh term

Part B: Based on what you observe about the first seven terms, which numbers below are also in the pattern? Select **all** of the numbers that are in the pattern.

377 955 1022 9992

Interaction: In Part A, the student drags digits 0-9 to boxes to create the next six terms in the number pattern. In Part B, the student clicks on the numbers that are in the pattern.

Rubric:
Part A: (1 point) The student correctly names the next six terms of the pattern (e.g., 12, 17, 22, 27, 32, 37).

Response Type: Drag and Drop

Part B: (1 point) The student correctly identifies other terms from the pattern (e.g., 377, 1022, 9992).

Response Type: Hot Spot