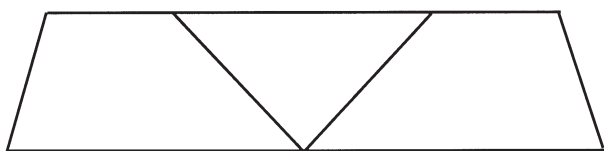


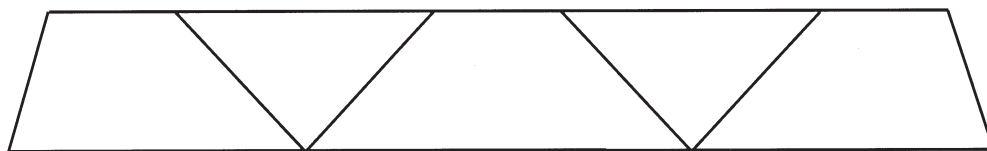
Pattern Block Walls

Chris and Jamie were having fun making pattern block wall designs.

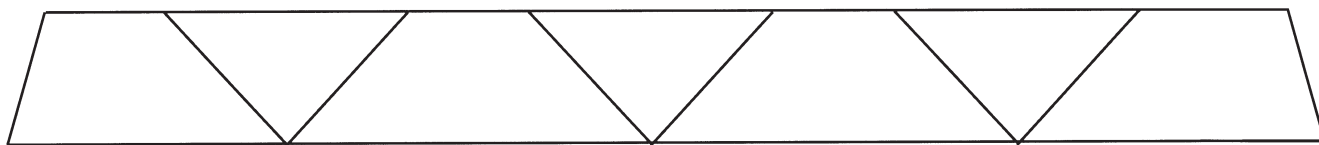
The first design had 1 green triangle and took 3 pattern blocks to build.



The second design had 2 green triangles and took 5 pattern blocks to build.



The third design had 3 green triangles and took 7 pattern blocks to build.



If this design continues...

How many blocks will Chris and Jamie use to build a design with 4 green blocks?

How many blocks will Chris and Jamie use to build a design with 8 green blocks?

Pattern Block Walls

Suggested Grade Span

Grades 3 – 5

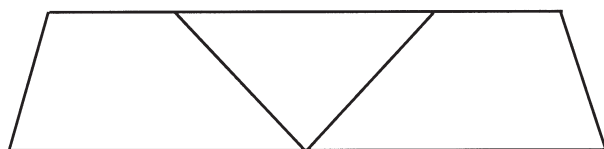
Grade(s) in Which Task Was Piloted

Grade 3

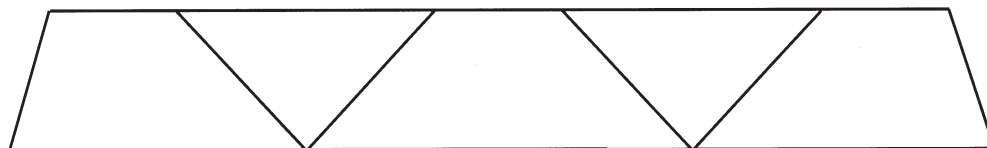
Task

Chris and Jamie were having fun making pattern block wall designs.

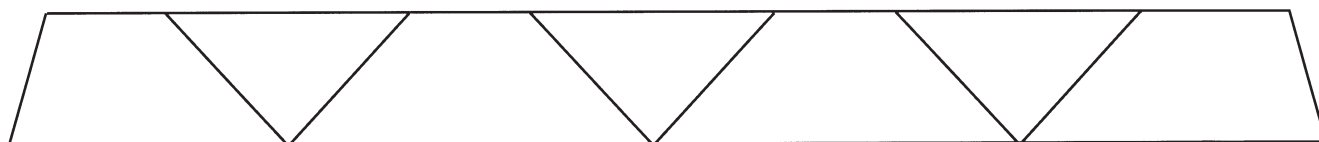
The first design had 1 green triangle and took 3 pattern blocks to build.



The second design had 2 green triangles and took 5 pattern blocks to build.



The third design had 3 green triangles and took 7 pattern blocks to build.



If this design continues...

How many blocks will Chris and Jamie use to build a design with 4 green blocks?

How many blocks will Chris and Jamie use to build a design with 8 green blocks?

Alternative Versions of Task

More Accessible Version: (Use the same block pattern as above.)

Chris and Jamie were having fun making pattern block wall designs.

The first design had 1 green block and took 3 blocks to build.

The second design had 2 green blocks and took 5 blocks to build.

The third design had 3 green blocks and took 7 blocks to build.

If this design continues...

How many blocks will Chris and Jamie use to build a design with 4 green blocks?

How many blocks will Chris and Jamie use to build a design with 5 green blocks?

More Challenging Version: (Use the same block pattern as above.)

Chris and Jamie were having fun making pattern block wall designs.

The first design had 1 green block and took 3 blocks to build.

The second design had 2 green blocks and took 5 blocks to build.

The third design had 3 green blocks and took 7 blocks to build.

If this design continues...

How many blocks will Chris and Jamie use to build a design with 10 green blocks?

How many blocks will Chris and Jamie use to build a design with 100 green blocks?

How many blocks will Chris and Jamie use to build a design with N green blocks?

NCTM Content Standards and Evidence

Algebra Standard for Grades 3–5

Instructional programs from Pre–Kindergarten through grade 12 should enable students to...

- Understand patterns, relations, and functions.
 - *NCTM Evidence:* Describe, extend, and make generalizations about geometric and numeric patterns.
- *Exemplars Task Specific Evidence:* This task requires students to identify and extend a geometric pattern.

Time/Context/Qualifiers/Tip(s) From Piloting Teacher

This is a medium length task.

Links

This task could link to a unit on famous walls such as the Great Wall of China, or the Berlin Wall.

Pattern Block Fish, also featured in this issue of **Exemplars**, requires the same strategy and could be given to students along with this task as part of a choice menu.

Common Strategies Used to Solve This Task

Most students create a chart to record data given in the task and then extend the chart to achieve a solution.

Possible Solutions

Original Version:

Green	Total
1	3
2	5
3	7
4	9
8	17

More Accessible Version:

Green	Total
1	3
2	5
3	7
4	9
5	11

More Challenging Version:

Green	Total
1	3
2	5
3	7
10	21
100	201
N	$2N + 1$

Task Specific Assessment Notes

General Notes: Most students will create a chart to record and analyze data. Math language will be limited to geometry, although the task assesses patterns, functions, and algebra concepts.

Novice: The novice will not know to organize information presented in the task.

Apprentice: The apprentice will attempt to organize information presented in the task or to make the patterns using pattern blocks, but s/he will not know how to proceed or will proceed incorrectly.

Practitioner: The practitioner will organize information presented in the task and will be able to identify and extend the pattern to achieve a solution.



Expert: Not only will the expert identify and extend the pattern, but the expert will also be able to generalize the solution so that the total for any number of green triangles can be found.

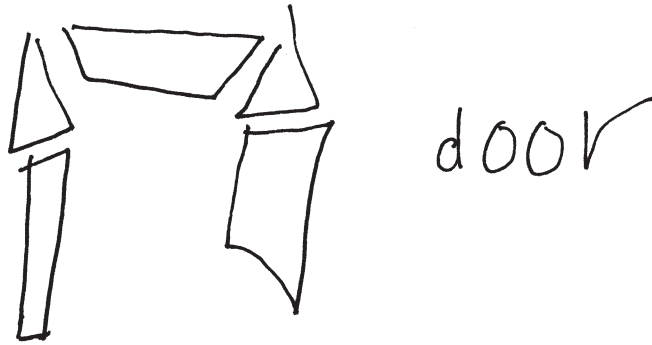
Author

This task was written by **Deb Armitage**, K – 8 Mathematics Assessment Consultant at the Vermont Department of Education. The task was piloted by teachers and students in Vermont.

Exemplars

Novice

triangle trapezoid
 



The student is unable to engage in the mathematical situation presented in the task.

Apprentice

I need to find out how many blocks are in a 4+8 green block design. I will make a table.

triangle	trapezoid	Total blocks
1	2	3
2	3	5
3	4	7

The trapezoid is Red and the triangle is green.

The math representation is used to communicate problem solving and shows some understanding.

An attempt is made at a systematic approach.



Paraphrasing of the task is present.

Some awareness of the audience is present through student commentary.

The student has a strategy that will work but does not proceed to a solution.

Practitioner

Ineed to findout how many blocksaveing H+8 Green block design. I will make a T-chart

triangle 	trapezoid 	block total
1	2	3
2	3	5
3	4	7
4	5	9
5	6	13
6	7	1
7	8	15
8	9	17

* answers

A correct strategy is chosen.

Patterns and structures are noted.

This chart is constructed to portray the solution and is used as a strategy.

Response is methodical, sequenced, and labeled.

Observations are made about increases in columns.

Expert

I need to find out how many blocks are in a 4+8 green block design.

I will make a T-chart

The triangle is green. The trapezoid is red

triangle	trapezoid	total blocks
1	2	3
2	3	5
3	4	7
4	5	9
5	6	11
6	7	13
7	8	15
8	9	17
9	10	19

I found a rule

rule
 $Tri + 1 = 7$
 $2 + 1 = 3$
 $10 + 1 = 11$
 Key $100 + 1 = 101$

Tri = triangle
 T = trapezoid

The total blocks goes up by 2
 $2Tri + 1 = total$

The student analyzes the situation in mathematical terms.

Precise math notation and language of geometry and an attempt at an algebraic notation are used.

The student uses evidence to support statements.

The student generalizes the solution by determining rules for solving the problem.

Representations are constructed to analyze relationships.

A sense of audience and purpose is demonstrated through the student's commentary.

The student connects an algebraic approach to a task involving geometric patterns.