

Shapes on the Playground

Mrs. Orange's class loves to play outside with large shape blocks. The first student took a square outside. The second student took a circle outside. The third student took a triangle outside. The fourth student took a square outside. If this pattern continues, what shape would the tenth student take outside?

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Suggested Grade Span

Grades Pre-K-2

Grade Level(s) in Which the Task Was Piloted

Grade 1

Task

Mrs. Orange's class loves to play outside with large shape blocks. The first student took a square outside. The second student took a circle outside. The third student took a triangle outside. The fourth student took a square outside. If this pattern continues, what shape would the tenth student take outside?

Alternative Versions of the Task

More Accessible Version:

Mrs. Orange's class loves to play outside with large shape blocks. The first student took a square outside. The second student took a circle outside. The third student took a square outside. The fourth student took a circle outside. If this pattern continues, what shape would the tenth student take outside?

More Challenging Version:

Mrs. Orange's class loves to play outside with large shape blocks. The first student took out a three-sided shape. The second student took out a four-sided shape. The third student took out a five-sided shape outside. The fourth student took out a four-sided shape. The fifth student took out a three-sided shape. If this pattern continues, what shape will the twentieth student take outside?

NCTM Content Standards and Evidence

Geometry Standard for Grades Pre-K-2

Instructional programs from pre-kindergarten through grade 12 should enable all students to...

- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
 - *NCTM Evidence:* Recognize, name, build, draw, compare, and sort two- and three-dimensional shapes.

- **Exemplars Task Specific Evidence:** This task requires students to recognize and name or draw two-dimensional shapes of squares, triangles, and circles.

Algebra Standards for Grades Pre-K-2

Instructional programs from pre-kindergarten through grade 12 should enable all students to...

- Understand patterns, relations, and functions.
 - **NCTM Evidence:** Recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns and translate from one representation to another.
- **Exemplars Task Specific Evidence:** This task requires students to recognize and extend a pattern of shapes.

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

This task is a short to medium length task. Students who piloted this task had recently worked with pattern block shapes and making patterns. This task assesses students' recognition of squares, circles, and triangles, as well as patterning and number sense to 10.

Links

The Greedy Triangle by Marilyn Burns would complement this task well, as it introduces students to different sided shapes.

Common Strategies Used to Solve This Task

Most students draw and label diagrams to solve this task.

Possible Solutions

Original Version:

<i>Student</i>	<i>Shape</i>
1	square
2	circle
3	triangle
4	square
5	circle
6	triangle
7	square
8	circle
9	triangle
10	square

More Accessible Version:

<i>Student</i>	<i>Shape</i>
1	square
2	circle
3	square
4	circle
5	square
6	circle
7	square
8	circle
9	square
10	circle

More Challenging Version:

<i>Student</i>	<i>Shape</i>
1	<i>triangle</i>
2	<i>square</i>
3	<i>pentagon</i>
4	<i>square</i>
5	<i>triangle</i>
6	<i>square</i>
7	<i>pentagon</i>
8	<i>square</i>
9	<i>triangle</i>
10	<i>square</i>
11	<i>pentagon</i>
12	<i>square</i>
13	<i>triangle</i>
14	<i>square</i>
15	<i>pentagon</i>
16	<i>square</i>
17	<i>triangle</i>
18	<i>square</i>
19	<i>pentagon</i>
20	<i>square</i>

Task Specific Assessment Notes

General Notes: This task will help the teacher not only assess students' problem solving skills, but also their ability to identify shapes and patterns.

Novice: The novice will demonstrate little or no understanding of the 3 shapes, the pattern, nor the need to find for the tenth student.

Apprentice: The apprentice will have a partially correct solution. The apprentice may be able to identify the 3 shapes, but will not correctly identify or extend the pattern, or may not

Practitioner: The practitioner will have a correct solution with supporting work.

complete the pattern to the tenth student.

Expert: The expert will have a correct solution, and will go above and beyond the task requirements by making mathematically relevant comments or by extending the solution.

Author

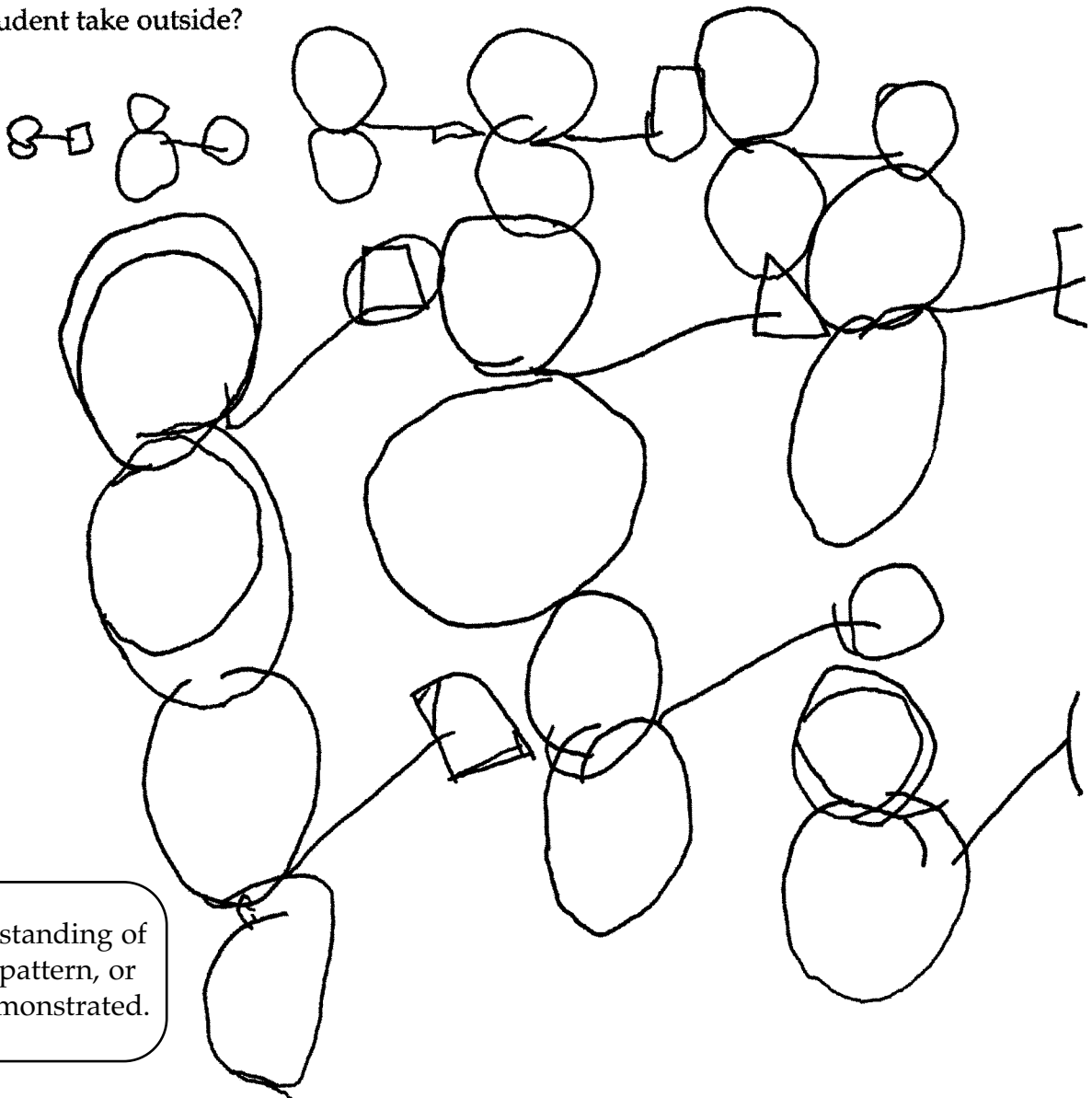
This task was written by **Deb Armitage**, Pre- K-8 Mathematics Assessment Consultant at the Vermont Department of Education. The task was piloted by teachers and students in

Novice

No connections are made, and there is no awareness of audience.

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Mrs. Orange's class loves to play outside with large shape blocks. The students decided to take a square outside to play with. The first student took a square outside. The second student took a circle outside. The third student took a triangle outside. The fourth student took a square outside. What did the tenth student take outside?



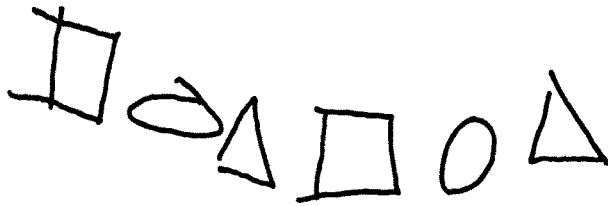
No understanding of triangle, pattern, or 10th is demonstrated.

Apprentice

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The student neglects to extend the pattern to 10 students.



The student has a partial solution. All shapes are correctly identified and the pattern is correctly extended.

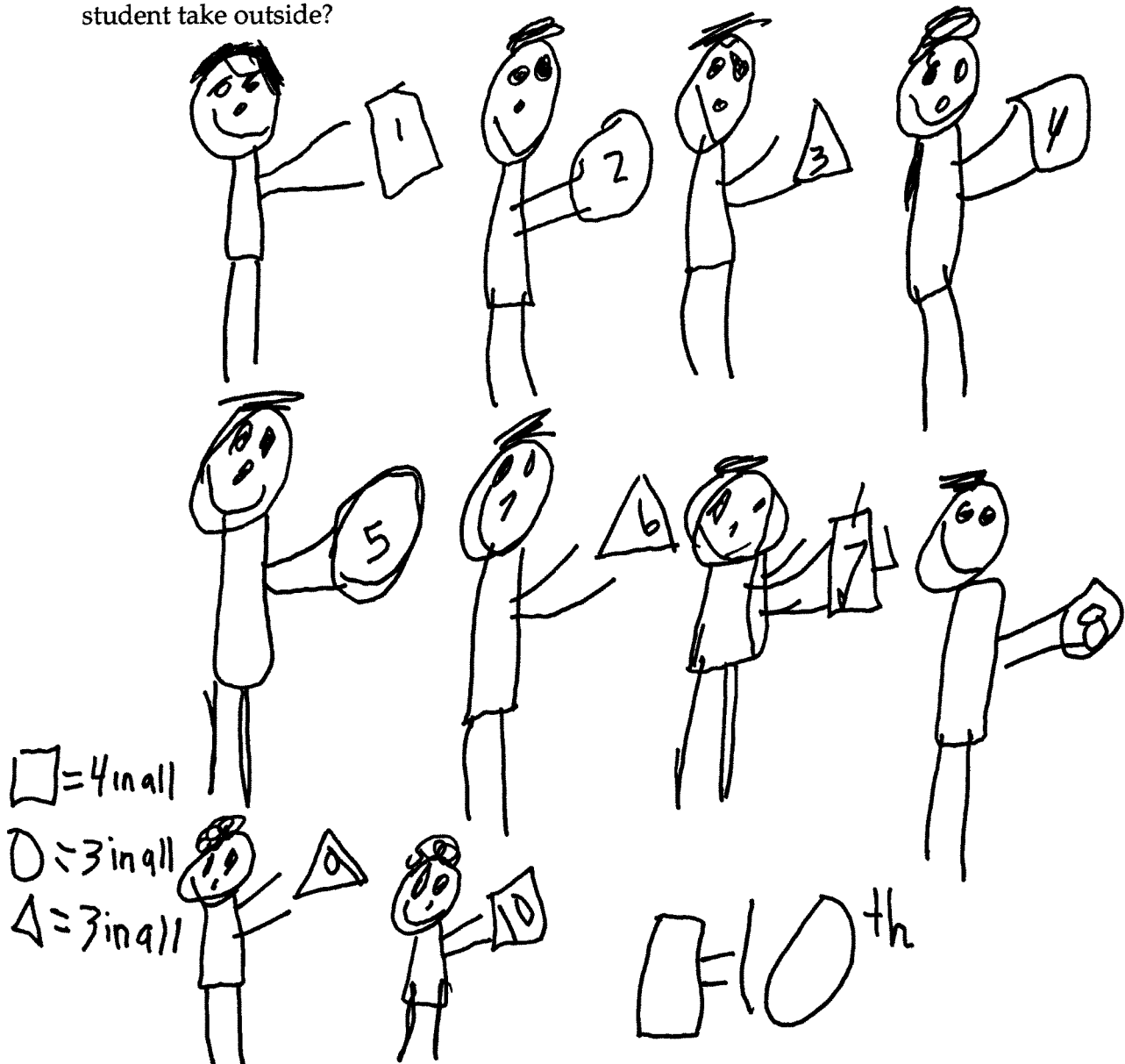
A sense of audience is communicated through a labeled solution.

Practitioner

Clear diagrams are used to communicate a correct solution. Diagrams portray the solution.

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Exemplars

Evidence is used to support conclusions. An awareness of audience is evident through labeling and commentary.

Expert

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10. $\square \bigcirc \triangle \square \bigcirc \triangle \square \bigcirc \triangle \square$

tenth square

The observations made by the student are used to extend the solution and generate new conclusions.

12. $\square \bigcirc \triangle \square \bigcirc \triangle \square \bigcirc \triangle \square \bigcirc \triangle$

12 is a triangle

every 2 ends in a different shape

A correct answer is achieved with supporting work. The student extends the solution beyond the task requirements.

14.

1	\square	80
2	0	9 \triangle
3	\triangle	10 \square
4	\square	11. 0
5	0	12 \triangle
6	\triangle	13 \square
7	\square	14 0

14 is a circle