Area Patterns

Math Concepts

- whole numbers
- addition
- comparing numbers
- multiplication
- estimation
- functions
- measuring area
- similar shapes

Materials

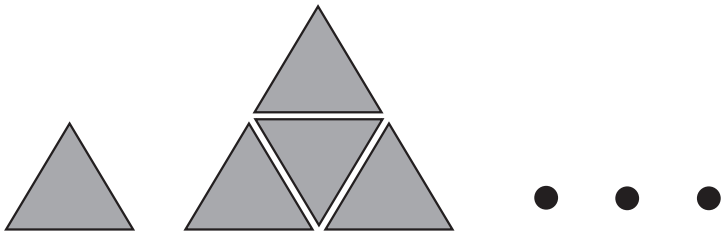
- TI-10, TI-15 Explorer™
- Pattern Blocks
- **Area Patterns** recording sheets
- pencils

Overview

Students will investigate patterns in ordered pairs generated by constructing a sequence of similar shapes. They will then use the patterns and the calculator to predict the number of blocks it will take to build a specific shape in the sequence.

Introduction

1. Have students use the green triangles from Pattern Blocks (or the paper triangle provided on page 39) to make the following pattern.



2. Ask students to predict how many green triangles it will take to make the next larger triangle of the same shape. Continue the pattern.
3. In the table on the recording sheet, have students draw each triangle and then record the number of blocks it took to make it (its area in green triangles).
4. Have students investigate the patterns in their tables, use the calculator to predict the area of the 95th triangle, and write their predictions on the recording sheet.
5. Have students choose a different Pattern Block (such as the blue rhombus) and perform the same investigation.
6. Ask students to compare the patterns generated by the different shapes and write about their discoveries.

Area Patterns *(continued)*

Collecting and Organizing Data

While students explore their patterns, ask questions such as:

- What unit of area are you using to measure the area of each shape? Why do you think it is an effective unit of measure?
- What do the numbers in your table(s) represent?
- What patterns do you notice in your table(s)?
- How can you be sure you made the next larger triangle? Do the patterns in your table help you discover when you have skipped a triangle? How?

- How are the numbers you see in the calculator display connected to the numbers in your table(s)?
- Use the scroll feature, ◀ ▶, to compare results.
- How can you use the calculator to predict the number of blocks it will take to construct the 95th shape in your sequence?
- What happens if your numbers get too big?

Analyzing Data and Drawing Conclusions

After students have investigated several sequences with different pattern blocks, have them work as a whole group to analyze the patterns in the ordered pairs in their tables. Ask questions such as:

1. How is your table for the green triangle different from your table for the blue rhombus? Why do you think they are different?
2. Are any of your tables alike? How can you explain this?
3. What difficulties did you have with the red trapezoid? How did you handle these problems? How did the table for the red trapezoid compare with the tables for some of the other shapes you investigated?
4. What patterns did you notice in your tables? How did you describe these patterns?
5. What discoveries did you make?

- How did you use your calculator to help you make predictions?
- How did you use your calculator to discover the patterns in the ordered pairs in your table(s)?

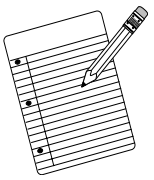
Area Patterns *(continued)*

Continuing the Investigation

Have students:

- Choose shapes not included in the Pattern Blocks (such as a rectangle or right triangle on page 39). Use the patterns in the ordered pairs generated by the Pattern Blocks to investigate patterns generated by these other shapes.
- Generate a table of ordered pairs and see whether they can find a series of shapes to go with it.

Name:



Area Patterns

Recording Sheet

Collecting and Organizing Data

Our first four or five similar shapes:

Our data is recorded here:

Shapes	Area (# of blocks)
1 (st)	
2 (nd)	
3 (rd)	
4 (th)	
5 (th)	
6 (th)	
.	
.	
.	

Analyzing Data and Drawing Conclusions

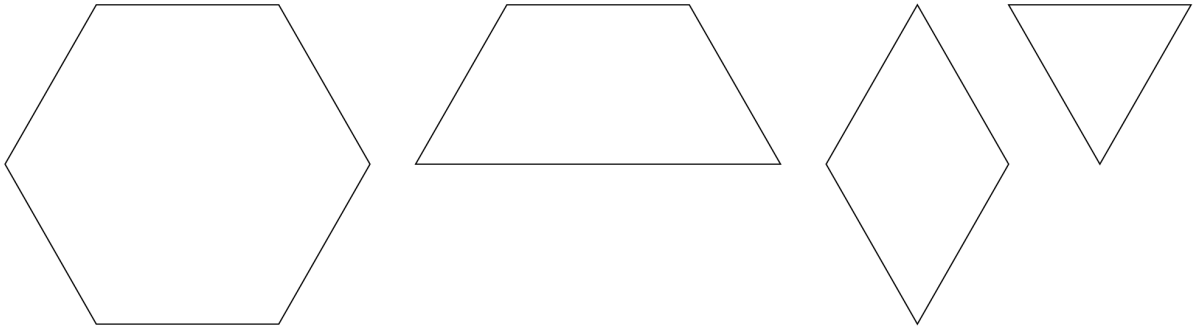
- A pattern we discovered in our table is:

- The 95th shape will take _____ blocks to build. We think this because:

Questions we thought of while we were doing this activity:

Area Patterns

Pattern Blocks



Other Geometric Shapes