



### 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 perimeter of a specific shape in the sequence.

**Grade Levels: 3–5**




### Concepts

- Whole numbers
- Addition
- Comparing numbers
- Multiplication
- Estimation
- Functions
- Measuring Perimeter
- Similar shapes



### Materials

-  TI-10 or TI-15 Explorer™ calculators
- Pattern Blocks
- Student activity sheet
- Pencils



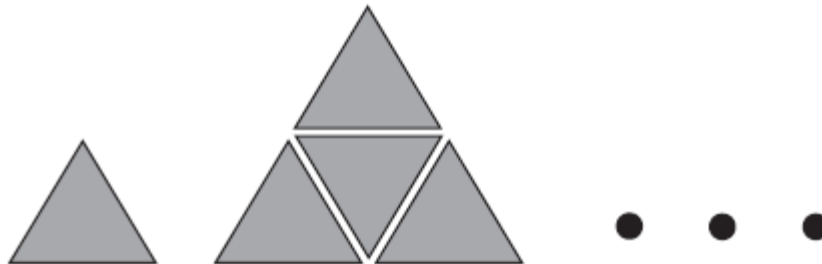
### Assessment

Throughout the activity, questions are included for formative assessment. Student work should be used as a check for understanding. Have the students use the TI-10 or the TI-15 Explorer™ calculator to complete the activity.



## Introduction

1. Have students use the green triangles from Pattern Blocks (or the paper triangle provided at the end of this activity) to make the following pattern.



2. Have students figure the perimeter of each triangle (each side of the small triangle counts as one unit) and predict the perimeter of the next triangle. Continue the pattern.
3. Have students draw each triangle and then record its perimeter in the table on the activity sheet.
4. Have students investigate the patterns in their tables, use the calculator to predict the perimeter of the 95<sup>th</sup> triangle, and write their predictions on the activity sheet.
5. Have students choose a different Pattern Block (such as the blue rhombus) and perform the same investigation.
6. Have students compare the patterns generated by the different shapes and write about their discoveries.

## Collecting and Organizing Data


While students explore their patterns, ask questions such as these:

### Questions for Students:

- ❖ *What unit are you using to measure the perimeters? Why do you think it is an effective unit of measure to use?*
- ❖ *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 tables help you discover when you have skipped a triangle? How?*



### Using the Calculator

- *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 perimeter of the 95<sup>th</sup> 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:

#### Questions for Students:

- ❖ *How is your table for the green triangle different from your table for the orange square or the blue rhombus? Why do you think they are different?*
- ❖ *Are any of your tables alike? How can you explain this?*
- ❖ *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 of some of the other shapes you investigated?*
- ❖ *What patterns did you notice in your tables? How did you describe these patterns?*
- ❖ *What discoveries did you make?*



## Using the Calculator

- *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)?*

## Continuing the Investigation

Have students:

- Choose shapes not included in the Pattern Blocks (such as a rectangle or right triangle). Identify a unit to measure the perimeters and look for patterns.
- Generate a table of ordered pairs and see whether they can find a series of shapes to go with it.



## SOLUTIONS



Name \_\_\_\_\_

Date \_\_\_\_\_



**Focus:** Find patterns in perimeters.

### Perimeter Patterns

#### Collecting and Organizing Data

Our first four or five similar shapes:

Answers will vary. Encourage students to draw the shapes for the first few patterns.

Our data is recorded here:

Shapes	Perimeter
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 95<sup>th</sup> shape will have a perimeter of \_\_\_\_\_. We know this because:

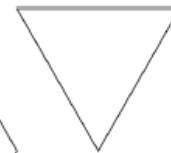
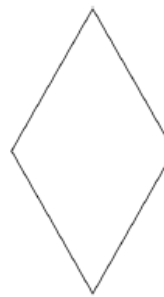
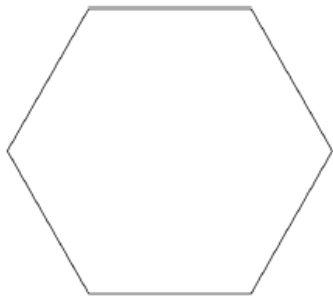
Answers will vary. Have students write an equation to show their reasoning.

**Questions we thought of while we were doing this activity:**



## Perimeter Patterns

### Pattern Blocks



### Other Geometric Shapes

