Double Your Design

Math Concepts

- whole numbers
- 2-dimensional geometric figures
- addition
- symmetry

Materials

- TI-10
- Pattern Blocks
- **Double Your Design** recording sheets
- small mirrors
- crayons or markers

Overview

Students will use Pattern Blocks to investigate symmetry by building a design, making its mirror image, and using the calculator to determine the value of both the first design and its reflection.

Introduction

Completing the **Design a Quilt** activity on page 37 before beginning this activity might be helpful.

1. On the overhead projector, build a simple design with overhead Pattern Blocks. Decide on a line of symmetry, mark it with a transparency marker, and use additional Pattern Blocks to build the mirror image of the original design.

   Note: A small mirror is helpful in deciding where the blocks should be placed to form a reflection of the original design.

2. Have students build their own designs using Pattern Blocks or the paper pattern blocks provided on page 44. Then have them transfer their designs to the triangular grid on their recording sheets, using crayons or markers.

3. Ask students to assign a value of 1¢ to the green triangle and figure the value of their original designs.

4. Have students show the reflections of their designs on the triangular grid on their recording sheets.

5. Have students use the value of their original designs to predict the value of their reflected designs. Ask them to record their predictions.

6. Then have students figure the total value of their reflected designs and compare it to their predictions.

Double Your Design *(continued)*

Collecting and Organizing Data

While students are constructing and recording their designs, ask questions such as:

- What Pattern Blocks are you using in your design?
- Where is your line of symmetry? How are you using the mirror to reflect your design along your line of symmetry?
- If we assign a value of 1¢ to the green triangle, how much do you think your original design is worth? Record your prediction and then find out.
- How much do you think your reflected design is worth? Write down your prediction and then find out.
- What is the total value of both designs? Write down your prediction and then find out.

How can you use [Opl] to help you find the value of your design?

How are you using the calculator to help you find the value of your design?

What operations can you use on the calculator to help you find the value of your design?

How can you decide if the answer you are getting on the calculator is reasonable or not?

Analyzing Data and Drawing Conclusions

After students have recorded the value of their designs, have them work as a whole group to analyze their triangular grids. Ask questions such as:

- How did you predict the number of green triangles it would take to build your original design?
- How could you describe the way you found the value of your original design? Its reflection?
- How did the mirror help you build the reflection of your original design?
- How did you find the total value of your design and its reflection?

How did you use the calculator to help you find the value of your designs?

What operations did you use on the calculator to help you find the value of your designs? Which one do you think worked the best?

Does the order in which you entered the numbers in your calculator matter? Why or why not?

If you changed the value of the green triangle to 2¢, how would you change the way you used the calculator? What would stay the same?

Continuing the Investigation

Have students change the value of the green triangle and find the new values of their designs.

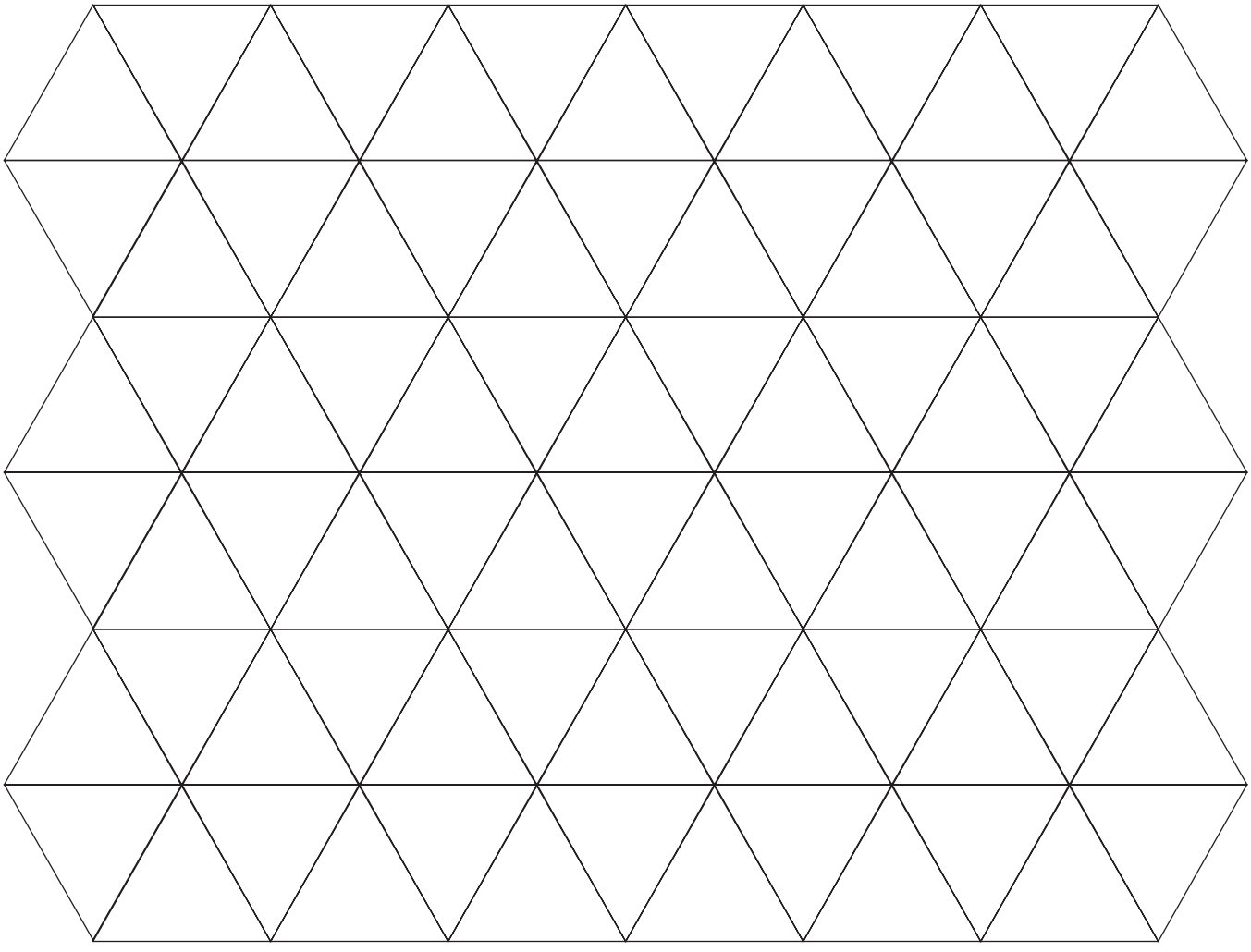
Name:

Double Your Design

Recording Sheet

Collecting and Organizing Data

Record your design and its mirror image below. Be sure to include your line of symmetry.



Analyzing Data and Drawing Conclusions

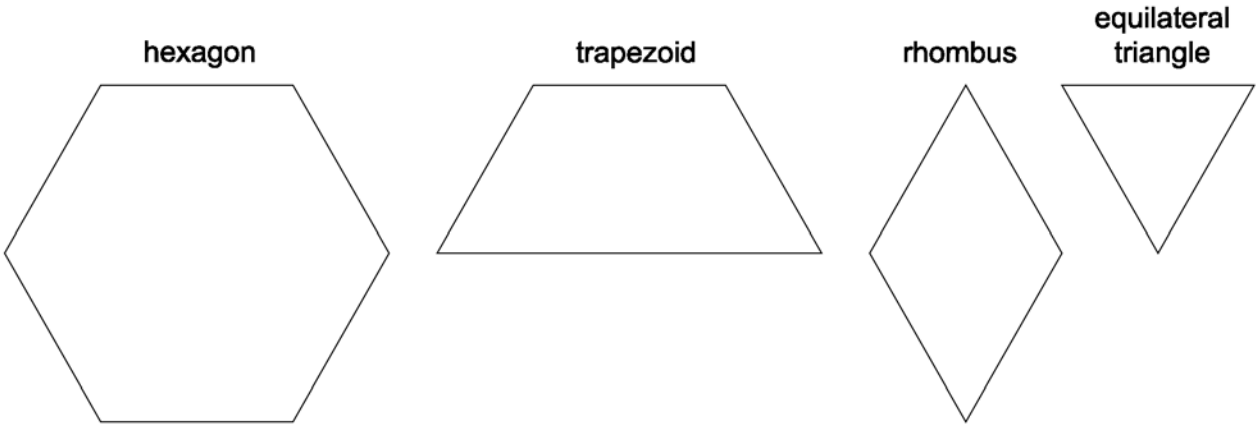
My first design is worth: _____

My design and its reflection is worth: _____

Questions we thought of while we were doing this activity:

Double Your Design

Pattern Blocks



Other Geometric Shapes