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INTRODUCTION

Measure and Solve: Perimeter and Area provides ideas for engaging grade 5-8 students in problem-centered activities, games, and projects involving perimeter and area. Pattern blocks, color tiles, and tangrams are used throughout the activities of this resource book as students explore ideas and problem-solve. Fast 4! section openers pose shorter, targeted problems to reinforce learning on an on-going basis. Performance assessments at the end of each section suggest tasks to help teachers profile students' understandings. In addition, applied problems and technology integration are present throughout the book.

This resource may be used as a unit for instruction on measurement. As such, it is divided into four sections that focus on important aspects of measuring perimeter and area.

- *Border Problems: Perimeter and Circumference*
- *Area Strategies: Rectangles and Parallelograms*
- *Areas of Other Polygons: Triangles, Trapezoids, and Other Shapes*
- *Area of Circles*

Each section begins with an introduction page which highlights the key vocabulary and important concepts presented in the pages that follow. Most activities and games assume that students will work collaboratively with a partner and have ready access to available technology and materials necessary to communicate their ideas and findings. Features which recur throughout this book to support these actions are:

TOOLS   A list of materials necessary for the activity.

WARM-UP   Activities and suggestions which allow students to explore or review understandings critical to the central TASK of a lesson.

TASK   The major problem which guides the activity or project.

COMMUNICATE   Questions which might be asked by the teacher or otherwise be presented, to provide opportunity for students to respond orally or in their math log to communicate their mathematical understanding.

REASONING   Questions or ideas posed to prompt an understanding of how or why a concept works.

Calculator or computer alternatives that may be integrated.

NEXT STEPS...   Natural extensions of a game or activity.

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What patterns can you find?
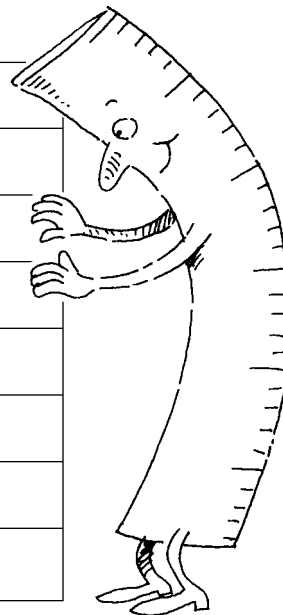
PERIMETER PATTERNS

Generous supply of pattern blocks for each pair of students, Math Log, writing utensil.

With a partner, make a train of six hexagons. As you add each hexagon, record the perimeter of the train in the chart below. Then answer the questions that follow in your math log.

# of hexagons	Perimeter of Train
1	
2	
3	
4	
5	
6	
n	

- How did the train's perimeter grow with each additional hexagon?
- Explain why the perimeter increased as it did, not increase by 5 units each time?
- Write an expression for the perimeter of any hexagon train.
  Use **n** to stand for the number of hexagons.   **P** = _____

TASK
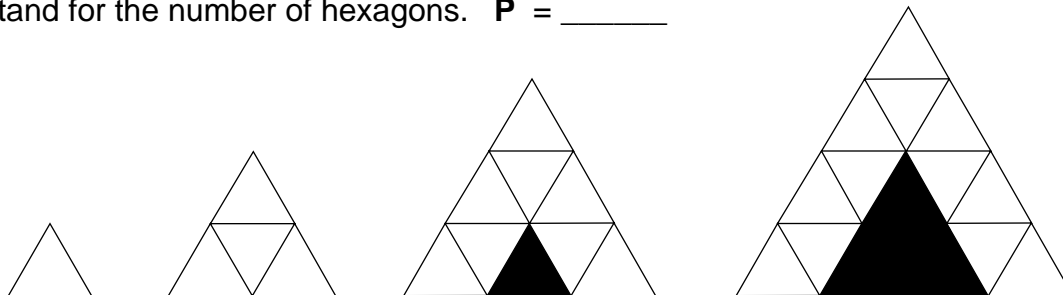
Use pattern blocks to create each of the first three steps in the triangular number pattern. Sketch the first four steps in your Math Log.

- What type of pattern is this?
- Describe how the perimeter increases in each step.
  Extra for Experts: Write a mathematical expression to describe this increase.
- What pattern do you notice with the shaded interior regions?
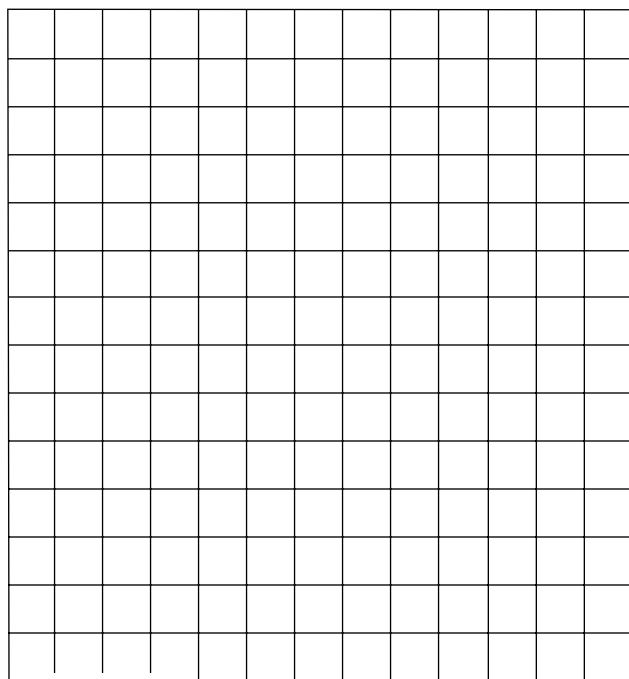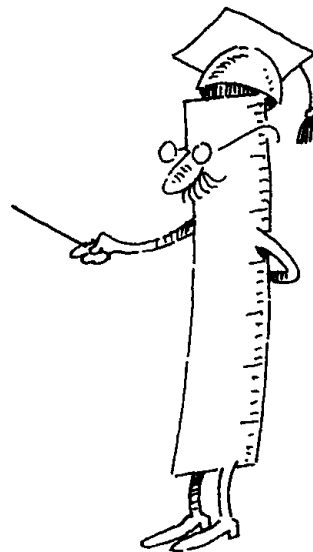
A Partner Game

THE GRID GAME

For each pair of students: Grid paper, 2 (1-6) dice, two differently colored pencils.

Objective: Given an area, cover the most space on the grid by creating polygons with the greatest possible perimeter.

GAME RULES

- Players choose a color.
- Each player rolls a die. Highest roll goes first.
- In turn, roll and add the numbers on two dice.
- On the grid, outline and color a polygon having an area equal to the dice sum. Polygons cannot overlap on the grid.
- Count and record the polygon's perimeter.
- The game ends when both players have rolled areas that cannot fit on the grid.
- The player with the higher total perimeter wins!

Player A: Perimeter	Player B: Perimeter

- Which strategies could be used to get the greatest possible perimeter?
- Explain the strategies you used to block your opponent.
- How can a given area have different possible perimeters?

COMMUNICATE

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