

POTYOMINO LESSONS

Henri Picciotto  www.MathEducationPage.org

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POLYOMINO LESSONS

Contents

Introduction	1-2
Finding the Polyominoes.....	3-8
Family Trees.....	9-11
Polyomino Covers	12-17
Tiling	18-33
Perimeter and Area	34-39
Related Shapes	40-42
Appendices	
Hints.....	43-44
Solutions.....	45-52
Comments for the Teacher	53-54
Polyomino Patterns	55-57
Grid-paper masters	58-60

INTRODUCTION

Polyominoes are the shapes made by joining squares edge-to-edge. They were named and first studied by mathematician Solomon W. Golomb, starting in 1953. Martin Gardner's "Mathematical Games" column in *Scientific American* popularized many polyomino puzzles and problems. Pentominoes, the special case of polyominoes of area 5, have enjoyed the greatest success among recreational mathematicians, game players, and puzzle buffs, and are now finding their way into the classroom.

This book provides an introduction to polyominoes for students in grades 4 through 8. Most of the lessons can also be adapted for use in primary and high school classes also.

THE AUTHOR

HOW TO USE THIS BOOK

The only materials required are grid paper and pencils for your students. (Quarter-inch grid paper works well.) You may also use the duplicating masters at the back of this book. A permanent grid on a chalkboard and/or on grid transparencies for the overhead projector can also be helpful in conducting whole-class lessons and demonstrations.

Optional materials: interlocking cubes, Perceptual Puzzle Blocks™, plastic pentominoes, pattern blocks, tangrams, Supertangrams™, geoboards, Soma Cubes.

Allow students to work in groups and/or to share the results of individual work with each other. You may wish to use a bulletin board to post solutions to particularly challenging problems.

A Hints section is provided for some of the more difficult problems. Every problem or question in the activity pages that has a corresponding hint in the Hints section is marked with ★.

If students have their own copies of this book, you will probably want to remove the solution pages. You may also wish to remove the Hints section and share the hints with the students when you feel it is appropriate.

Page-by-page suggestions for using the activities can be found in the Comments for the Teacher section at the end of this book.

Note that there is more than one solution (sometimes, even hundreds) for most of the problems and puzzles in this book. One solution, however, has been provided in the Solution Section for most of the problems and puzzles. Your students will find their own collection of solutions, which will probably be different from those of other groups of students.

This book can serve as an introduction to more work with pentominoes or it can be used concurrently with the various pentomino books

It is essential that your students keep track of their work and their results. They will draw answers to puzzles in the spaces provided on each page or on grid paper. Provide each student with a folder for his or her work.

The following material available from your local library may be of interest:

Gardner, Martin. "Mathematical Games." *Scientific American*, December 1957, November 1960, October 1965, September 1972, August 1975, April 1979. These are the articles that gave polyominoes the widest possible audience among recreational mathematicians and other puzzle buffs.

Golomb, Solomon W. *Polyominoes*. New York: Charles Scribner's sons, 1965. Written by the man who got it all going.

Journal of Recreational Mathematics. Many issues of this journal feature articles, problems, and puzzles on pentominoes and related topics. An indispensable source for polyomino fanatics. See Vol 16 (1983-84) no. 4, page 273, for a bibliography by William L. Schaaf.