

# CONTENTS

<b>Introduction</b> .....	vii
---------------------------	-----

## **Chapter 1**

Using patterns to determine what's ahead.....	1
Case 1 Patterns on the pocket chart.....	2
Case 2 Staircase Towers.....	6
Case 3 Staircase Towers and Penny Jar.....	9
Case 4 Four-element repeating patterns.....	11

## **Chapter 2**

Representing situations with tables, diagrams, and graphs.....	15
Case 5 Making sense of tables.....	17
Case 6 Lunch money models.....	20
Case 7 Penny Jar arrays.....	25
Case 8 Graphing staircase problems.....	28
Case 9 Making sense of coordinate graphs.....	37

## **Chapter 3**

Finding formulas.....	45
Case 10 Multiple formulas for blue and yellow tiles.....	47
Case 11 What's the formula for square borders?.....	51
Case 12 Finding strategies.....	54
Case 13 Henrietta's roost.....	59

## **Chapter 4**

Comparing linear functions.....	65
Case 14 The crawling crayfish.....	67
Case 15 Can Bolar catch up?.....	72
Case 16 Collecting bottles.....	75

## Chapter 5

Does doubling work? .....	83
Case 17 5- and 10-floor buildings .....	85
Case 18 Cookies and candies .....	87
Case 19 Growing worms, No. 1 .....	89
Case 20 Growing worms, No. 2 .....	94
Case 21 What's the formula for square borders?—revisited .....	99
Case 22 Penny Jar revisited .....	101

## Chapter 6

Examining non-constant rate of change .....	103
Case 23 Fastwalker .....	105
Case 24 Folding paper.....	108
Case 25 How many outfits?.....	111
Case 26 Playing with squares .....	116

## Chapter 7

Functions without formulas .....	119
Case 27 How low will it go? .....	121
Case 28 Melting snow and ice.....	123
Case 29 The burning candle .....	126

## Chapter 8

Highlights of related research .....	133
Introduction.....	133
Mathematics of Patterns, Functions, and Change for the Kindergarten–Grade 8 Classroom	
Section 1 Overview of the Mathematics of Patterns, Functions, and Change.....	135
Section 2 Patterns and Sequences.....	139
Section 3 Linear Functions .....	141
Section 4 Nonlinear Functions.....	153
Section 5 Data-Based Functions .....	161
Section 6 The Concept of Function.....	164
References .....	166