

50 Pre-Algebra Activities

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J. WESTON
WALCH
PUBLISHER

Portland, Maine

Contents

<i>Introduction</i>	<i>v</i>
<i>Using This Book</i>	<i>vi</i>
Chapter 1	Using Variables to Describe Patterns 1
Lesson 1-1	Geometric Patterns I 1
Lesson 1-2	Geometric Patterns II 2
Lesson 1-3	Perimeter Patterns 3
Lesson 1-4	Number Tricks 4
Lesson 1-5	Number Relationship Applications 5
Lesson 1-6	Postal Rate Patterns 5
Lesson 1-7	Numerical Patterns I 6
Lesson 1-8	Numerical Patterns II 8
Chapter 2	Introduction to Equality and Equations 29
Lesson 2-1	Equality 29
Lesson 2-2	Introduction to Equations 30
Lesson 2-3	Arrow Pictures and Inverse Operations 31
Lesson 2-4	Balance-Preserving Operations 32
Lesson 2-5	Solving Weight Balance Problems 34
Lesson 2-6	Linking Scales and Equations 35
Lesson 2-7	Solving Equations with Arrow Pictures 38
Lesson 2-8	Problem Solving with Arrow Pictures and Equations 41
Lesson 2-9	Applications in Problem Solving 42
Chapter 3	Graphing 80
Lesson 3-1	Points and Ordered Pairs I 80
Lesson 3-2	Ordered Pairs for Points on Segments 81
Lesson 3-3	Points and Ordered Pairs II 82
Lesson 3-4	Finding Equations of Lines 83
Lesson 3-5	Graphing Lines 83
Lesson 3-6	Graphing Nonlinear Figures 84
Chapter 4	Functions 103
Lesson 4-1	Introduction to Functions 103
Lesson 4-2	Functions from Arrow Diagrams 105
Lesson 4-3	Functions from Tables 105
Lesson 4-4	Functions from Equations 106



Introduction



The lessons in this book were written to help students develop their algebraic thinking. As students complete these lessons, they should understand the meaning behind algebraic expressions and equations. Although means of solving equations will be explored, the emphasis will be on why they work rather than on a rote memorization of procedures. The major topics addressed are

1. algebraic representations of numerical relationships
2. the concept of equality
3. simple algebraic equations and their solutions
4. graphing numerical and algebraic relationships
5. the concept of functions

This approach is consistent with the National Council of Teachers of Mathematics position concerning the development of algebraic concepts and processes. The following quotes are from page 102 of the well-known NCTM publication *Curriculum and Evaluation Standards for School Mathematics*.

It is essential that students explore algebraic concepts in an informal way to build a foundation for the subsequent formal study of algebra. Such informal explorations should emphasize physical models, data, graphs, and other mathematical representations rather than facility with formal algebraic manipulation.

Learning to recognize patterns and regularities in mathematics and make generalizations about them requires practice and experience. Expanding the amount of time that students have to make this transition to more abstract ways of thinking increases their chances of success. By integrating informal algebraic experiences throughout the K–8 curriculum, students will develop confidence in using algebra to represent and solve problems.



Using This Book



The lessons in this book were written to be used as a supplement to a textbook for a pre-algebra course. In some instances, lessons could be used as a supplement to a standard algebra textbook.

The authors have tried to make the lessons easy to use. Many of the lessons have prerequisite lessons. When that is the case, the prerequisite lessons are listed. Most of the lessons involve worksheets and transparencies. Worksheet masters and transparency masters are provided. Worksheets and transparencies are keyed to individual lessons. For example, the transparency for Lesson 1-1 is labeled “Transparency 1-1,” while the two worksheets for this lesson are labeled “Worksheet 1-1-1” and “Worksheet 1-1-2.” On the other hand, Lesson 1-2 has only one worksheet, and it is labeled “Worksheet 1-2.”

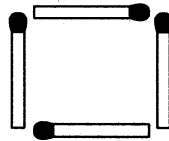
In most cases, it is suggested that lessons be introduced in a large group format and that the worksheets be completed by individual students. It is also possible to use these lessons with individual students or with small groups. Once a lesson is introduced in a large group situation, students can be assigned to groups of three or four, and the worksheets can be completed by the groups.

In most instances, the numbers involved in individual lessons are whole numbers. A special note is included in lessons where computation involves negative integers. It is assumed that students are aware of the conventional order of operations agreements, including the use of grouping symbols and the distributive property.

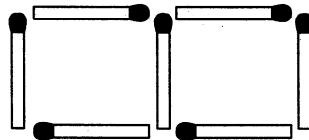
Transparency 1-1

Squares can be made using matchsticks. The squares in this lesson will be made in a special way. This is shown below.

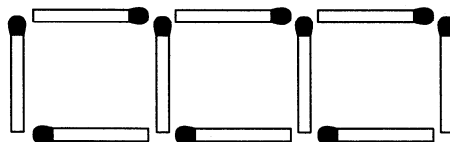
First



Second



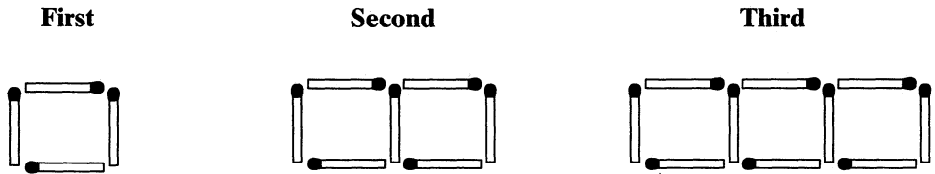
Third



Name _____
 Date _____

————— Geometric Patterns I —————

1. Squares can be made using matchsticks. The squares in this lesson will be made in a special way. This is shown below.



a. Draw pictures of the next two arrays of squares.

b. Complete the following table.

Number of Squares	Number of Matchsticks
1	
2	
3	
4	
5	
6	
10	
100	
n	

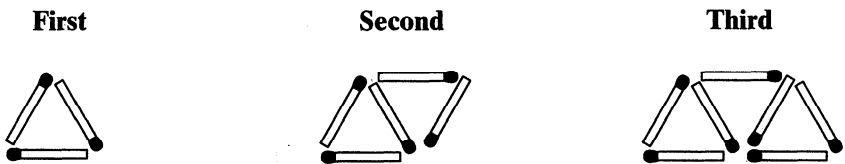
Name _____

Date _____

Worksheet 1-1-2

Geometric Patterns I

2. Triangles can be made using matchsticks. The triangles in this lesson will be made in a special way. This is shown below.



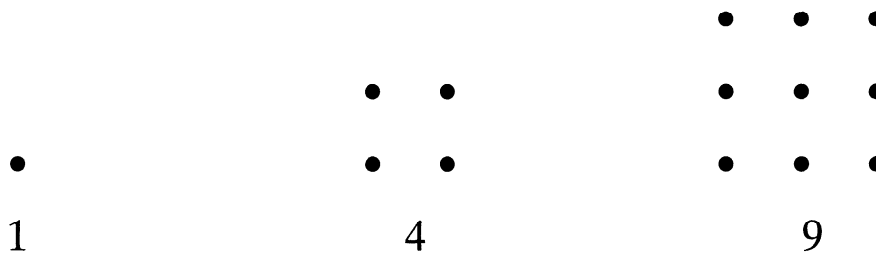
a. Draw pictures of the next two arrays of triangles.

b. Complete the following table.

Number of Triangles	Number of Matchsticks
1	
2	
3	
4	
5	
6	
10	
100	
n	

Transparency 1-2

1. Numbers that can be represented by a square array of dots are called **square numbers**. The first three square numbers, together with the arrays that go with them, are given below.



Make an array for the next square number.

2. Complete the table below.

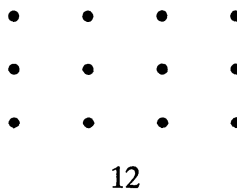
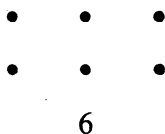
SQUARE NUMBERS								
1st	2nd	3rd	4th	5th	6th	10th	100th	<i>n</i> th

Name _____
 Date _____

Worksheet 1-2

Geometric Patterns II

1. Numbers that can be pictured as a rectangular array of dots are called rectangular numbers, if there is one more dot in each horizontal row than in each vertical column. The first three rectangular numbers and the arrays that go with them are pictured below.



Draw an array for the next rectangular number.

2. Complete the table below.

RECTANGULAR NUMBERS								
1st	2nd	3rd	4th	5th	6th	10th	100th	<i>n</i>th