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# INTRODUCTION

**M***athematics with Unifix Cubes* is organized around basic mathematical concepts taught in the early elementary grades. Relevant focal points and related connections from the recent National Council of Teachers of Mathematics *Curriculum Focal Points* (2006) are provided for each activity.

Since their appearance more than 50 years ago, Unifix Cubes have become part of mathematics education throughout the world. The structured quality, bright colors, and durability of Unifix Cubes provide an exciting appeal for young children during early mathematical learning. They present a positive basis for the exploration and expansion of early mathematics. The principal value of Unifix Cubes lies in their capacity to present students with easily structured, concrete analogues of concepts involving number and operations. With minimal additional work on the part of teachers, geometry, measurement, algebra, and probability/statistics ideas can also be explored. All of these areas have taken on added importance in today's mathematics curriculum. Successful learning of mathematics is enhanced when Unifix Cubes are used.

- Students develop confidence and independent thinking in mathematics.
- Students have time to explore new interests and to think about mathematics.
- Students communicate about mathematics.

As students begin learning mathematics, it is important to note the value that mathematics educators have placed on the use of manipulatives at all grade levels. Research has shown that students learn and understand mathematics better when they are able to manipulate objects or construct models. The need for concrete materials such as Unifix Cubes is not limited to children in preschool or in the primary grades but is also needed for many students in middle school and high school. The ancient proverb "I hear, I forget; I see, I remember; I do, I understand," is indeed a statement that rings true for today's students in the study of mathematics.

The games and activities in this book focus on the student as an active participant in the learning process through the physical manipulation of Unifix Cubes. Each one provides ready-made sheets for teachers to use in the classroom, along with a list of concepts and skills, related NCTM focal points and connections, number of students involved in the activity, materials needed, directions for getting ready to use the activity, directions for play, and suggestions for variations in play. Some duplicating, cutting, and coloring are needed for various activities; however, most of the materials are contained in the book.

The Unifix Cube games and activities presented in these grade-level books are not part of a rigid curriculum, nor are they related to any prescriptive program. The cubes themselves provide a highly flexible and adaptable manipulative, capable of supporting cognitive and heuristic mathematics activities with meaning and self-evident proof. From Piagetian tasks such as conservation of quantity and one-to-one correspondence to basic operations, simple measurement, graphing, and ideas about probability, activities with the cubes become an exciting learning tool.

Unifix Cubes are unit-based as compared to base-10 blocks. Therefore, the activities cover a wide range of early mathematics. Although color has no significance as a representation of value, it does play an important role when dealing with various patterning activities. In turn, these activities provide an important link to algebraic thinking at an early level.

A student's excitement in learning and understanding mathematics is a joy for all teachers. It is hoped that the games and activities in this book will help provide a solid foundation for stimulating that learning excitement.

— Don S. Balka

# ABOUT THE AUTHOR / CONCEPT GRID

## About the Author

**Don S. Balka, Ph.D.**, is a noted mathematics educator who has presented more than 2,000 workshops on the use of math manipulatives with elementary school-aged children at national and regional conferences of the National Council of Teachers of Mathematics and at in-service trainings in school districts throughout the United States. He has visited and taught classes in schools throughout the United Kingdom and Ireland, where Unifix materials are an integral part of the mathematics classroom.

Balka is the author or co-author of numerous books for K–8 teachers, including *Developing Algebraic Thinking with Number Tiles*, *Hands-On Math and Literature with Math-Start*, *Exploring Geometry with Geofix*, and *2D and 3D Geometry with Interlocking Shapes*.

Balka has served as director of the National Council of Teachers of Mathematics, the National Council of Supervisors of Mathematics, and TODOS: Mathematics for All. He also served on the board of the School Science and Mathematics Association and is now president-elect.

## Concept/Skills-by-Activity Grid

CONCEPT/SKILL	ACTIVITY																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
One-to-one correspondence	X	X	X	X		X					X					X					
Conservation of quantity	X	X		X		X															
Greater than/less than		X		X	X	X	X													X	
Counting			X		X	X	X	X								X				X	
Ordering			X							X											
Number recognition								X												X	
Number words								X	X												
One more than/one less than											X										
Color recognition												X	X	X	X					X	X
Pattern making													X	X	X	X					
Spatial reasoning																X	X				
Spatial terms																	X				
Estimation of length																			X		
Ordering by length																			X		
Graphing																				X	

# NCTM CURRICULUM FOCAL POINTS

Grade K Curriculum Focal Points			
<b>Number and Operations:</b> Representing, comparing, and ordering whole numbers and joining and separating sets  <b>Geometry:</b> Describing shapes and space  <b>Measurement:</b> Ordering objects by measurable attributes  <b>Connections to the Focal Points</b>	<b>Data Analysis:</b> Children sort objects and use one or more attributes to solve problems.  <b>Geometry:</b> Children integrate their understandings of geometry, measurement, and number.  <b>Algebra:</b> Children identify, duplicate, and extend simple number patterns and sequential and growing patterns as preparation for creating rules that describe relationships.	Match Me, pp. 7–14	
		X	How Many? pp. 15–18
		X	Fill a Truck, pp. 19–25
		X	More or Less, pp. 26–30
		X	Spin to Win, pp. 31–33
		X	Counting Cubes, pp. 34–35
		X	Cube Count, pp. 36–43
		X	First to Twenty, pp. 44–46
		X	Number Names, pp. 47–48
		X	What Position? pp. 49–50
		X	Spin a Step, pp. 51–55
		X	Wiggles, pp. 56–58
		X	Lots of Patterns, pp. 59–60
X	What Comes Next? pp. 61–62		
	Pattern Making, pp. 63–66		
	Copy Me, pp. 67–68		
	Perfect Placement, pp. 69–71		
	Guess My Length, pp. 72–73		
	Grab Bag, pp. 74–75		
X	Unifix Bingo, pp. 76–77		

## Concept or Skills

Conservation of quantity, one-to-one correspondence between set and number

## NCTM Curriculum Focal Point

**Prekindergarten Number and Operations:** Whole numbers, including correspondence, counting, cardinality, and comparison

**Kindergarten Number and Operations:** Representing, ordering, and comparing whole numbers; joining and separating sets

## Number of Students

1–4

## Materials

For each student or group:

- 55 Unifix Cubes
- Match Me Number Cards 1–10

## Getting Ready

Distribute 55 Unifix Cubes to each student or group. Make copies of the Match Me Number Cards for each student or group. The blank cards can be used to make different configurations of 2 cm × 2 cm squares for students to cover. Cut the number cards apart and combine them into a single deck.

## Digging In

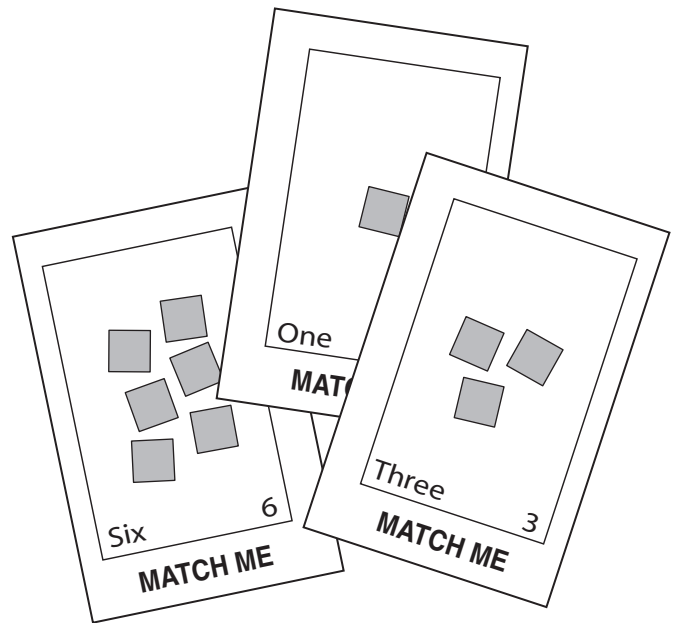
With the guidance of a teacher, each student draws a Match Me Number Card and covers it with the corresponding number of Unifix Cubes. Teacher questioning can focus on conservation of quantity. For example, if the student snaps the Unifix Cubes together to make a structured bar, you may ask whether there are more, fewer, or the same number of cubes as the number shown on the card. Other discussion items might include having students say the name for the number of Unifix Cubes on the card. In small groups, questions might deal with who has the most (fewest) Unifix Cubes.

Individually or in groups, have students order the Match Me Number Cards from 1 to 10.

## Going Further

In a game format, use a 1–10 Spinner Sheet and spinner. Taking turns, the players spin the spinner and cover the corresponding number card with Unifix Cubes. The first player to cover all ten cards is the winner.

If a number card is already covered, the player loses that turn.

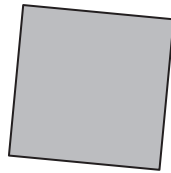


# MATCH ME

**MATCH ME**

One

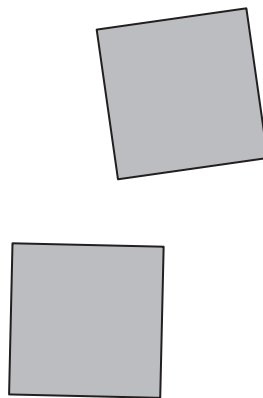
1



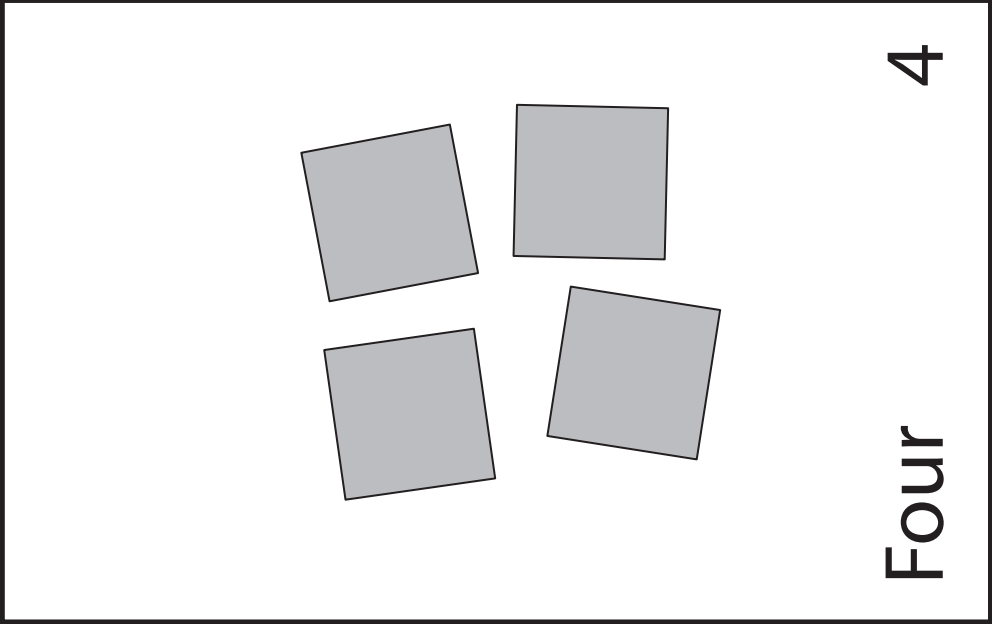
**MATCH ME**

Two

2



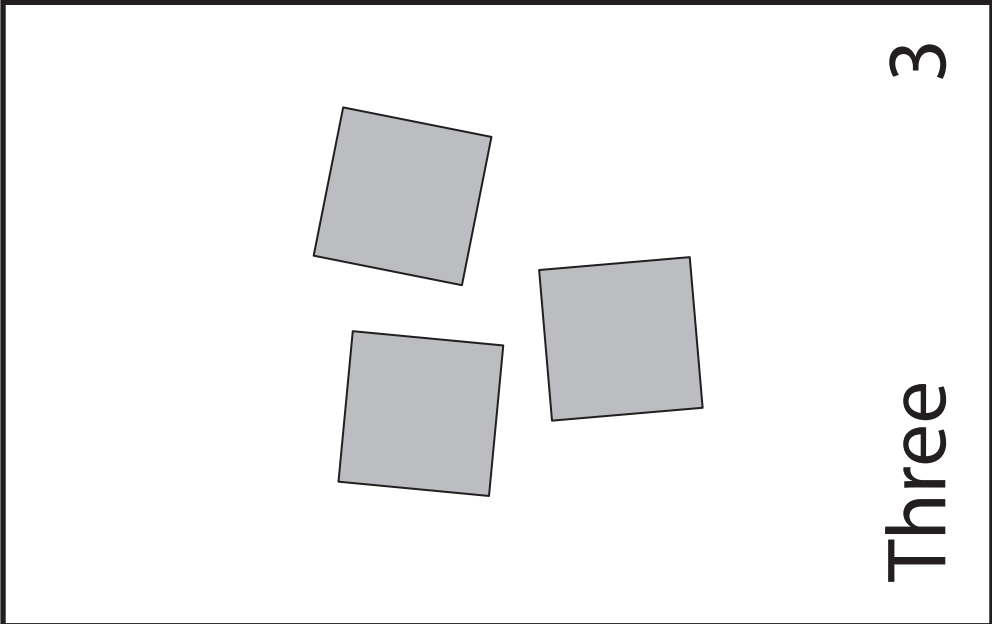
Four 4



MATCH ME

This block contains a rectangular frame with a white background. Inside the frame, there are four gray squares of varying orientations. To the right of the squares, the word "Four" is written vertically, and the number "4" is written vertically above it. To the right of the entire frame, the words "MATCH ME" are written vertically in a bold, black, sans-serif font.

Three 3



MATCH ME

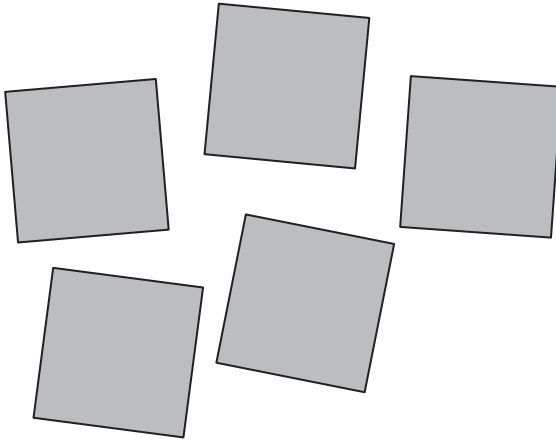
This block contains a rectangular frame with a white background. Inside the frame, there are three gray squares of varying orientations. To the right of the squares, the word "Three" is written vertically, and the number "3" is written vertically above it. To the right of the entire frame, the words "MATCH ME" are written vertically in a bold, black, sans-serif font.

# MATCH ME

**MATCH ME**

Five

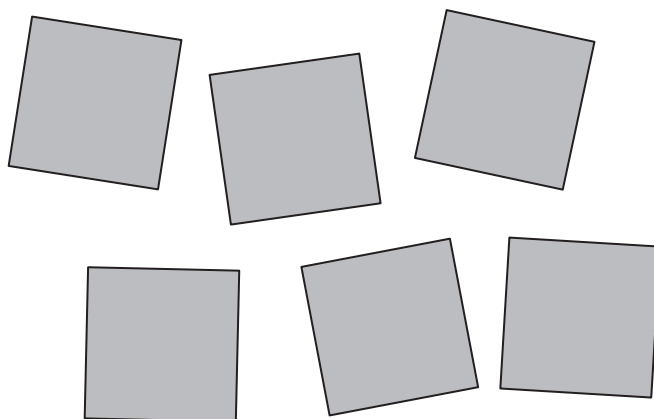
5



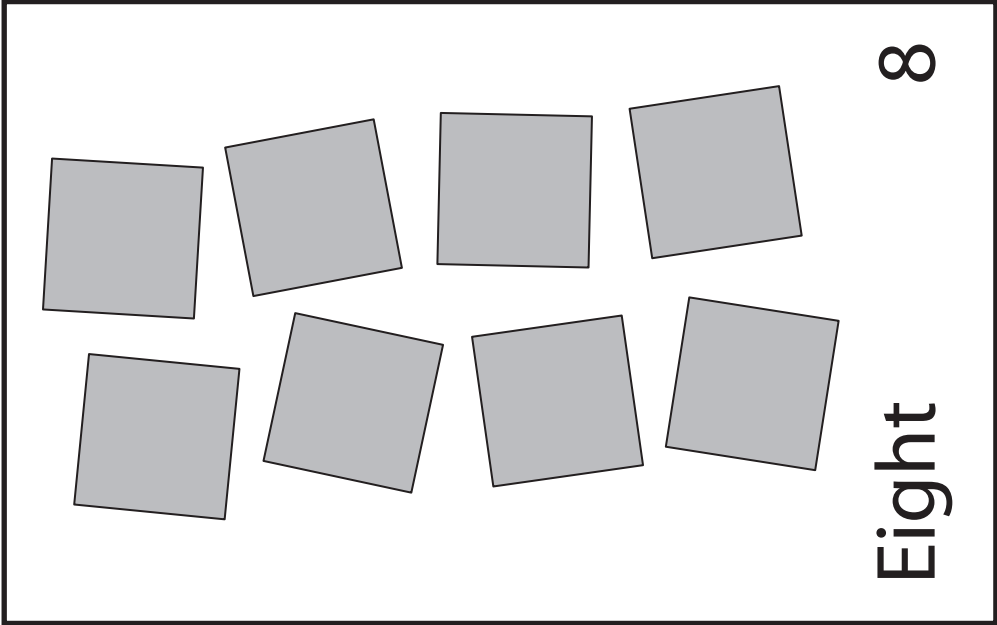
**MATCH ME**

Six

6



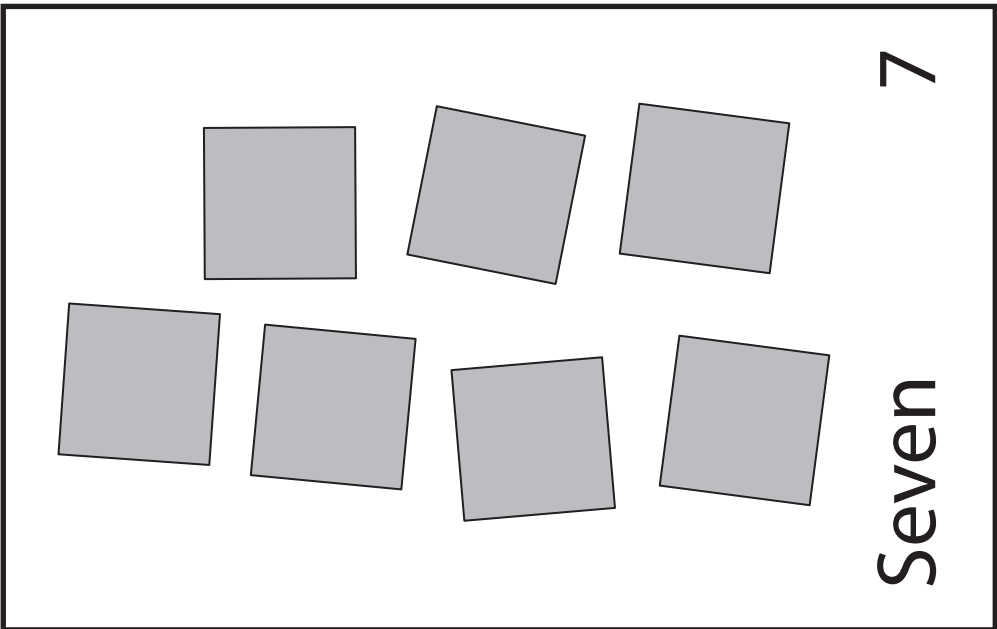




8

Eight

**MATCH ME**



7

Seven

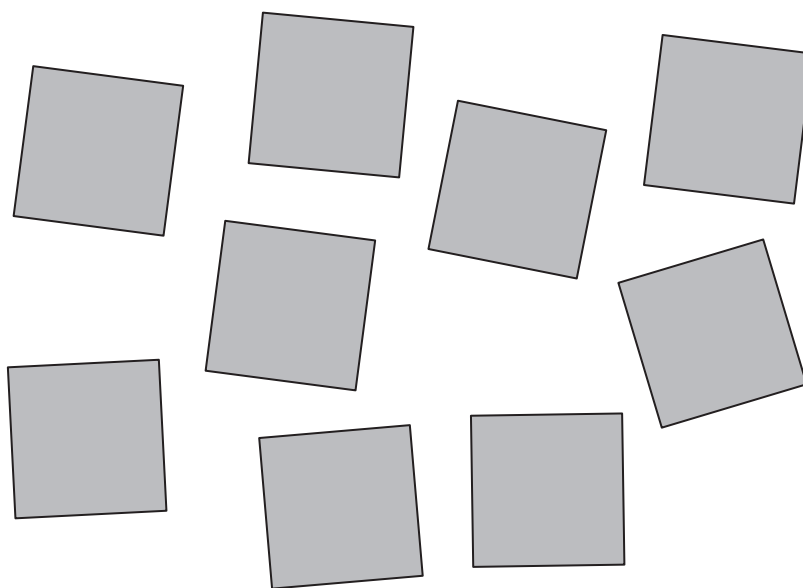
**MATCH ME**

# MATCH ME

**MATCH ME**

Nine

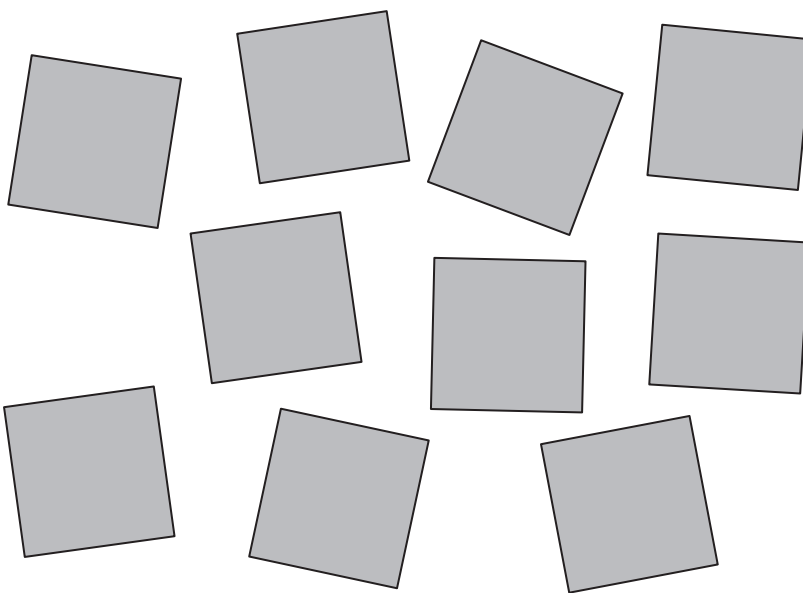
9



**MATCH ME**

Ten

10



**MATCH ME**

**MATCH ME**