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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 numbers 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 listing 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
Counting	X	X		X				X			X				X					
Greater than/less than	X			X				X			X				X					
One-to-one correspondence		X	X								X									
Addition		X		X		X	X	X	X											
Subtraction		X						X	X											
Number recognition					X						X									X
Number words					X						X									
Counting on					X															
Even and odd numbers										X	X									
One more than/one less than			X								X									
Place value											X			X						
Color recognition												X	X							X
Patterning												X	X							
Algebraic reasoning														X						
Ordered pairs														X						
Graphing														X			X	X		
Perimeter/area															X					
Spatial reasoning																X				
Spatial terms																X				
Estimating length																	X			
Measuring length																	X			
Ordering by length																			X	

NCTM CURRICULUM FOCAL POINTS

<i>Grade 1 Curriculum Focal Points</i>																				
Number and Operations and Algebra: Developing understandings of addition and subtraction and strategies for basic addition facts and related subtraction facts	X	Spin to Win, pp. 7–9																		
	X	Road Race, pp. 10–12																		
Number and Operations: Developing an understanding of whole number relationships, including grouping in tens and ones	X	Spin a Step, pp. 13–14																		
	X	Climb the Steps, pp. 15–16																		
Geometry: Composing and decomposing geometric shapes	X	First to Fifty, pp. 17–24																		
	X	Sum to 10, pp. 25–26																		
Connections to the Focal Points	X	Sum It Up, pp. 27–30																		
	X	Missing Addends, pp. 31–34																		
Number and Operations and Algebra: Children use mathematical reasoning, including ideas such as commutativity and associativity and beginning ideas of tens and ones, to solve two-digit addition and subtraction problems with strategies that they understand and can explain. They solve both routine and nonroutine problems.	X	Just the Facts, pp. 35–38																		
	X	Even Steven, pp. 39–40																		
Measurement and Data Analysis: Children strengthen their sense of number by solving problems involving measurements and data.	X	Hundred Board Activities, pp. 41–49																		
	X	What Comes Next? pp. 50–51																		
Algebra: Through identifying, describing, and applying number patterns and properties in developing strategies for basic facts, children learn about other properties of numbers and operations, such as odd and even, and 0 as the identity element for addition.	X	Pattern Making, pp. 52–55																		
	X	Arrow Diagrams, pp. 56–60																		
		Cube Count, pp. 61–68																		
		Perfect Placement, pp. 69–73																		
		How Long Is Your Foot? pp. 74–76																		
		Making Bar Graphs, pp. 77–81																		
		Line Up, pp. 82–83																		
		Unifix Bingo, pp. 84–85																		

Concept or Skills

Counting, greater than/less than (more/less)

NCTM Curriculum Focal Point

Number and Operations and Algebra: Addition and subtraction strategies

Number of Students

2

Materials

For each student:

- 10 Unifix Cubes of the same color

For each pair of students:

- Spin-to-Win Game Sheet
- More/Less Spinner Sheet
- Set of 10 markers (buttons, chips, rings)

Getting Ready

Make copies of the Spin-to-Win Game Sheet and More/Less Spinner Sheet for each pair of students.

Distribute 10 markers to each pair to use as “winner” awards for each round.

Initially, a teacher should demonstrate play to the entire class or pair of students, with each student grabbing a handful of Unifix Cubes.

Digging In

One side of the Spin-to-Win Game Sheet should be designated for each player.

In each round, players grab some or all of their 10 Unifix Cubes and place them on their side of the game sheet.

One player then spins the spinner on the More/Less Spinner Sheet.

If the arrow points to MORE, the player who has more Unifix Cubes wins the round and receives one marker as an award for the round. If the arrow points to LESS, the player who has fewer Unifix Cubes wins the round. If each player grabs the same number of cubes, either both receive a marker or neither receives a marker. Decide how to handle this situation before students play.

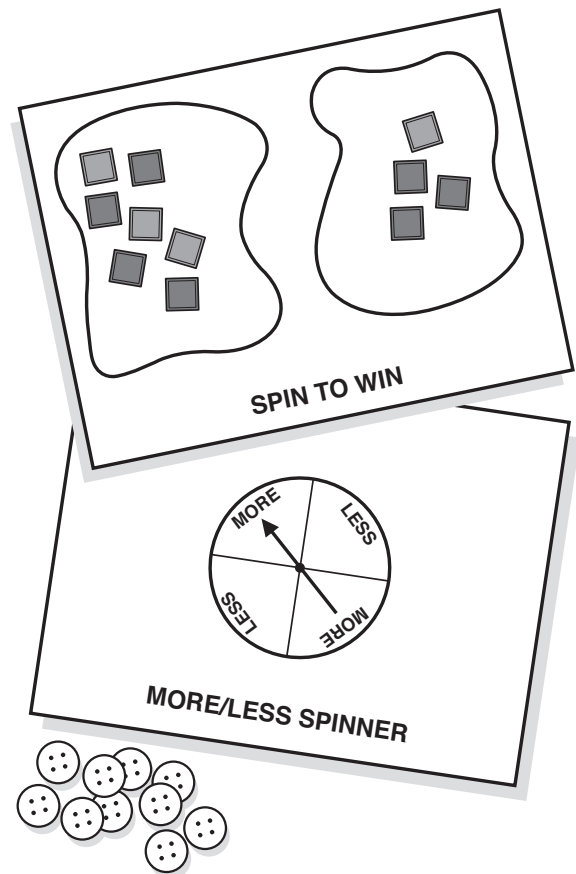
Instruct students to play five (or some designated number) of rounds. The player with more award markers at the end is the winner.

After each round, players should replace the Unifix Cubes drawn.

Going Further

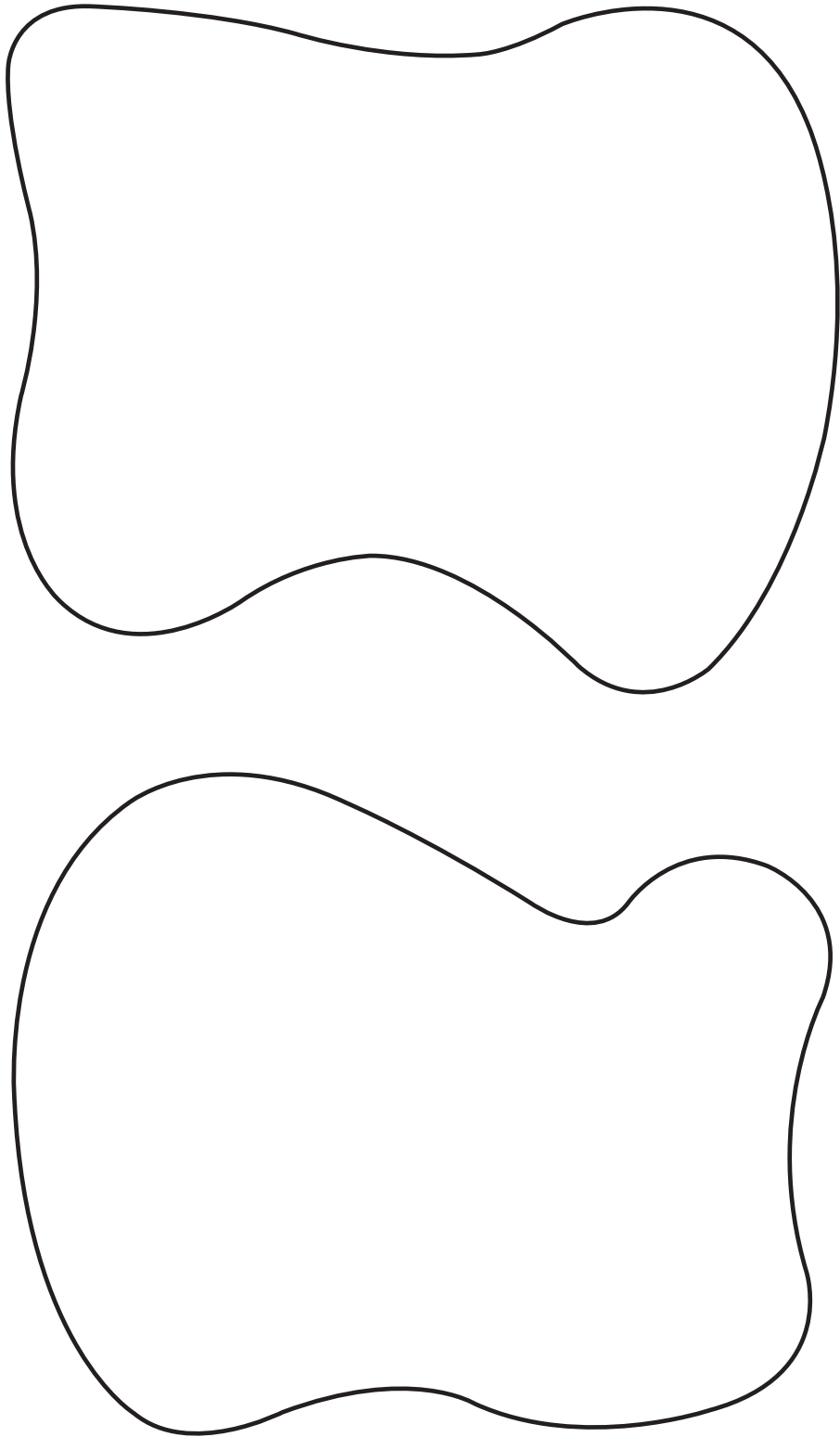
Understanding vocabulary is critical at this age. The phrase “grab *some* of the cubes” is often taken to mean “grab *all* of the cubes.” Spend some time discussing the distinction between the two words.

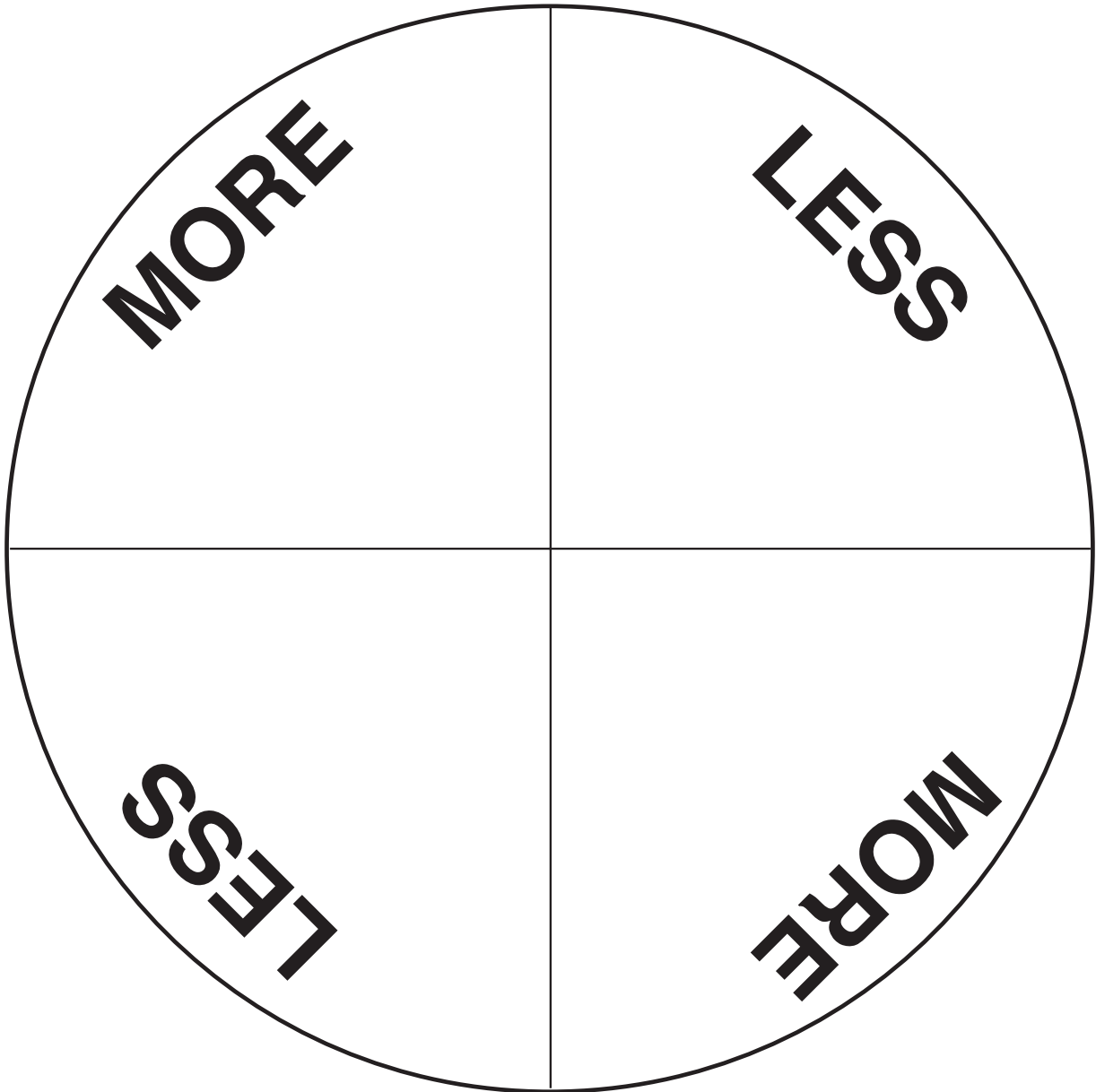
If students have difficulty in determining the winner of a round, have them connect the Unifix Cubes into bars and compare by length.



SPIN TO WIN

SPIN TO WIN





MORE/LESS SPINNER