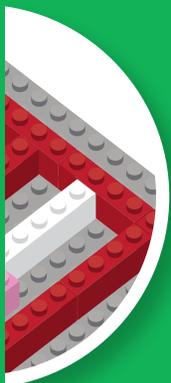
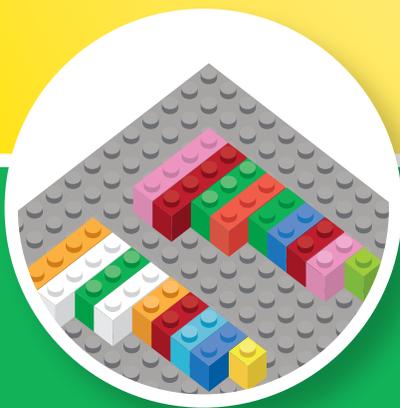
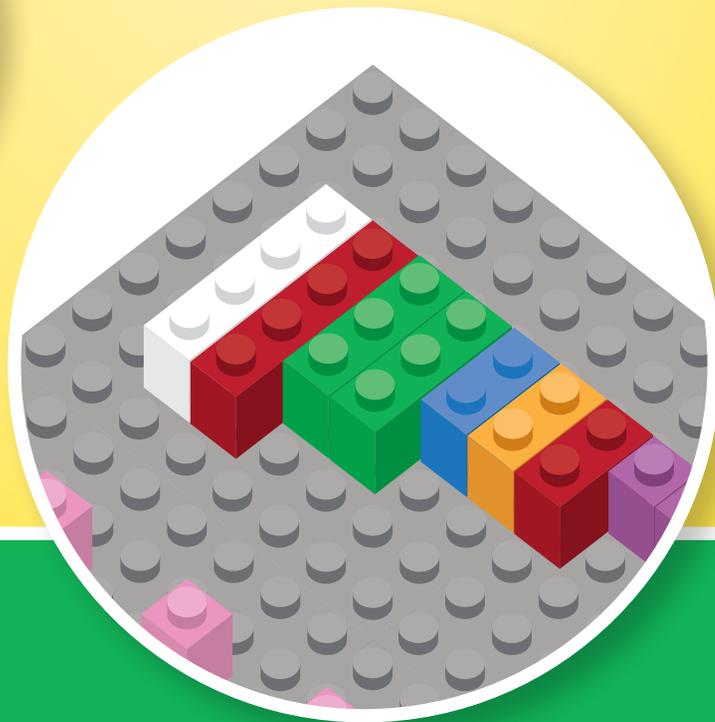
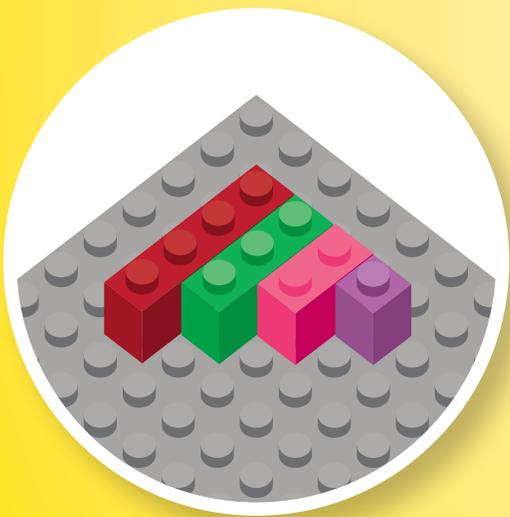


# TEACHING MULTIPLICATION USING LEGO® BRICKS



Dr. Shirley Disseler  
Math Curriculum Expert

Brick Math Series

# TEACHING MULTIPLICATION USING LEGO® BRICKS

Dr. Shirley Disseler





### SUGGESTED BRICKS

| Size | Number |
|------|--------|
| 1x1  | 25     |
| 1x2  | 30     |
| 1x3  | 1      |
| 1x4  | 1      |

Note: Using a base plate will help keep the bricks in a uniform line. Two base plates are suggested for these activities.

Note: It is helpful if sets are represented by different colors of bricks and the set multiplier bricks are all the same color within the problem.

# MULTIPLYING TWO-DIGIT NUMBERS BY ONE-DIGIT NUMBERS

## Students will learn/discover:

- How to multiply two-digit numbers by one-digit numbers
- The role of place value in reading and understanding numbers
- The use of expanded form when writing a number by its place value
- That multiplication is repeated addition
- Vocabulary:
  - **Multiplier:** the number that determines how many sets, or how many times a number is to be repeated or multiplied
  - **Multiplicand:** the number that is multiplied or repeated

## Why is this important?

It is important that students understand the value of digits within a number prior to multiplication in order to determine reasonability of the solution in the end. For example, if a student tries to multiply  $23 \times 6$  and does not understand that the digit “2” represents tens (thus equivalent to 20), he/she may arrive at an incorrect solution.

This activity is intended for those just beginning to multiply with two digits. It also reinforces the concept that multiplication is repeated addition.

## Brick Math journal:

After students build their models, have them draw the models on base plate paper and keep them in their Brick Math journals (see page 7 for more about the Brick Math journal). Recording the models on paper after building with the LEGO® bricks helps reinforce the concepts.

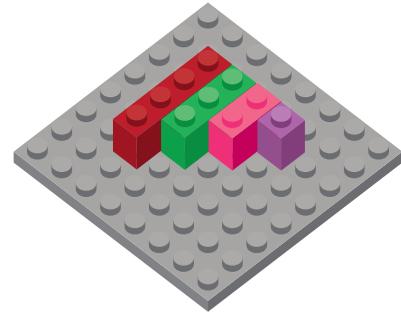


## Part 1: Show Them How #1 Multiplying two digits by one digit

Make sure students understand this modeling technique before moving on to solve the multiplication problem.

Model the number 1,111 as shown and explain:

- The 1x1 brick represents ones (in this case, 1)
- The 1x2 brick represents tens (in this case, 10)
- The 1x3 brick represents hundreds (in this case, 100)
- The 1x4 brick represents thousands (in this case, 1000)
- The expanded form of this number is  $1000 + 100 + 10 + 1$



After students understand this expanded form modeling technique, move on to the multiplication solution process.

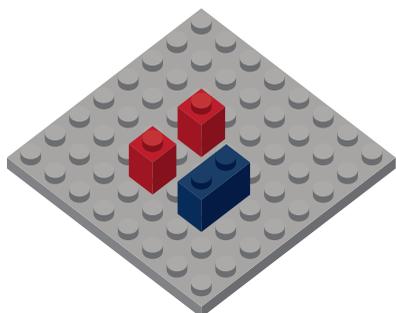
### Solve the problem $2 \times 10$ using the expanded form modeling technique.

1. Ask students what this problem represents.

Two sets of 10.

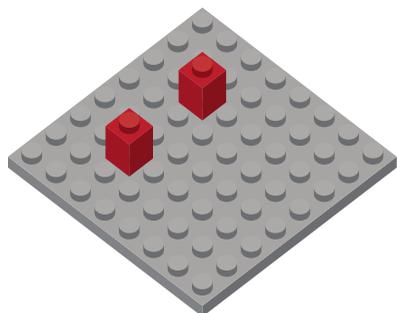
2. Ask students which number is the multiplier and which number is the multiplicand.

The multiplier is 2 and the multiplicand is 10.

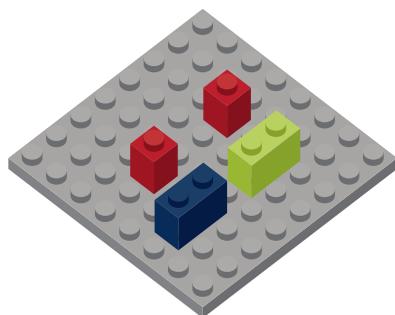


- 3.** Model the problem  $2 \times 10$ .

To model the multiplicand of 10, use one 1x2 brick (representing the 10). To model the multiplier of 2, use two 1x1 bricks (representing 2 sets).

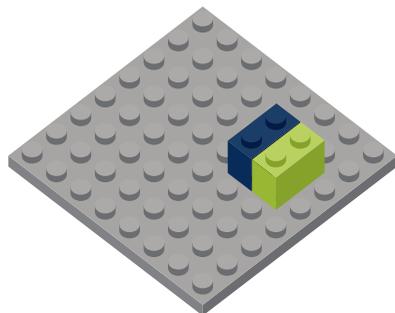


- 4.** Take each 1x1 brick and decompose them into two sets on another base plate.



- 5.** Take one 1x2 brick (representing 1 ten) and place it next to the first set marker to show one set of 10. Take another 1x2 brick and place it next to the other set marker.

- 6.** Remove the set marker bricks (the 1x1 bricks).



- 7.** Place the 1x2 bricks together to represent 2 tens, or 20. The solution is 20.

Point out that this model also shows  $10 + 10 = 20$ , using repeated addition.

## PRAISE FOR THE BRICK MATH SERIES: TEACHING MATH USING LEGO® BRICKS

“I finally know what a fraction is. I can *see* it!”

—Student

“Why doesn’t everyone learn math this way?”

—Student

“As an elementary teacher, exploring varying methods of learning is always necessary. From the very first activity in *Teaching Multiplication Using LEGO® Bricks*, it is clear that this book is extremely useful for any student learning (or struggling with) multiplication. For example, when learning/discussing fact families, I have witnessed many students blindly memorizing the facts without truly understanding *why* there is a relationship between the facts. By using different sizes of LEGO® bricks in one of the activities in this book, students are able to build and then observe a visual representation of the fact families. The students are able to see that one 1x6 brick contains the same number of studs as two 1x3 bricks.

In my experience as an educator, students tend to deeply grasp a concept whenever they are fully immersed in the learning process. The activities in this book require students to think critically about the process of multiplication that so often becomes robotic. *Teaching Multiplication Using LEGO® Bricks* covers multiplication processes such as: bundling, repeated addition, using place value, using array models, one-to-one correspondence, and more. Rather than blindly following a set of steps, students are able to build and think critically about what is happening as the problem evolves.

This book is a must-have for any educators exploring multiplication!”

—Elementary Teacher

“As an instructional coach at an elementary school, I have been searching for a teacher-friendly text that emphasizes the educational aspects of LEGO® bricks. *Teaching Multiplication Using LEGO® Bricks* helps breathe life back into mathematics, particularly multiplication instruction. The progression from basic multiplication principles to two- and three-digit multiplication problems is seamless. The students’ understanding of these concepts is reinforced when using the LEGO® bricks, and the text encourages students to explain their findings. I recommend *Teaching Multiplication Using LEGO® Bricks* to everyone in education who wants to take the next step in hands-on learning.”

— Kelli Coons, Instructional Coach

“*Teaching Fractions Using LEGO® Bricks* is a great resource for children to learn about fractions with conceptual understanding and modeling. It’s hands-on, engaging, and overall an exciting way to learn about fractions. When you bring LEGO® bricks into the classroom the students automatically react with “ooh, cool!” and they are hooked on the activity. There is nothing better as a teacher than seeing your students enjoy learning, and using this resource, I see that. Another great feature about this resource is that it utilizes various learning modalities. Students learn physically by manipulating the LEGO® bricks, they draw the models for a visual reference, they write and describe concepts for a verbal understanding, and they are able to reason about the models and concepts to have a comprehensive understanding of fractions. Overall, this resource is phenomenal, and students are sure to be excited about math and fractions!”

—Tina Lupton, Teacher

“The visual models in *Teaching Fractions Using LEGO® Bricks* helped my students see and understand how equivalent fractions really work. The activities are super easy to follow and make learning operations with fractions fun for both the students and the teacher!”

— Jamie Piatt, Fifth Grade Teacher

## *Teaching Multiplication Using LEGO® Bricks*

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