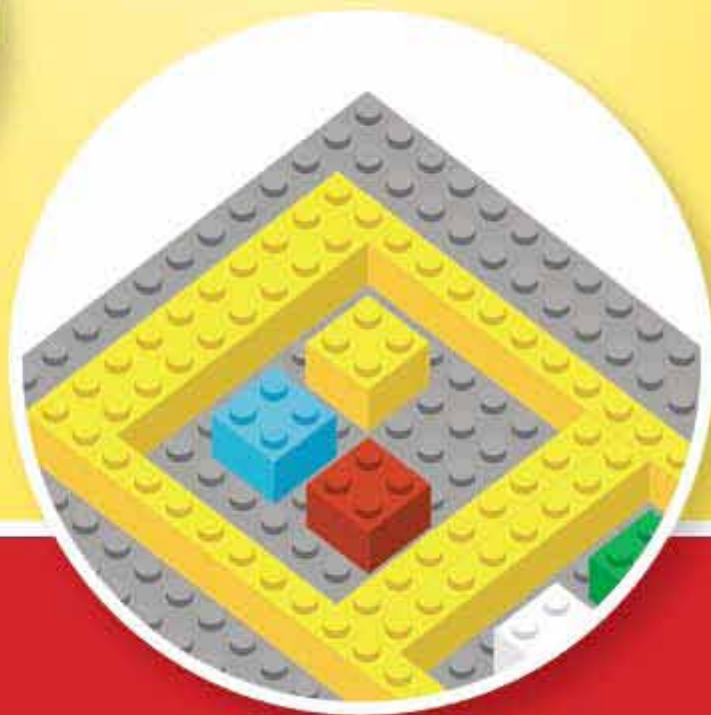
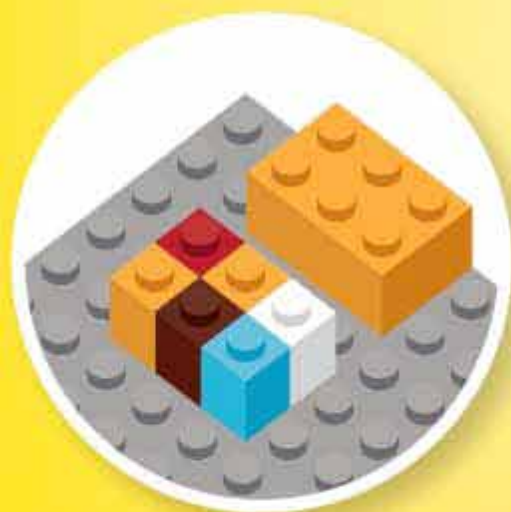


Brick Math Series

# TEACHING DIVISION USING LEGO® BRICKS



Dr. Shirley Disseler  
Math Curriculum Expert

Brick Math Series

# TEACHING DIVISION USING LEGO® BRICKS

Dr. Shirley Disseler





# DIVISION FACTS

## Students will learn/discover:

- The process of dividing with basic fact families
- What it means to divide parts of a whole

## Why is this important?

Linking division to fact families is important when young learners begin to divide. The process helps them make sense of number relationships, opposite operations, and sets.

This activity uses a strategy called “stud covering” to show the quotient in a division model using bricks. Other activities in this book use different strategies. Students benefit by seeing a number of modeling strategies to find one that best suits their learning needs.

## 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 to reinforce the concepts and engages both the creative and logical thinking processes.

## SUGGESTED BRICKS

Size	Number
1x2	8
1x3	4
1x4	4
1x6	2
2x2	18
2x3	2
2x4	2
2x6	2
2x8	2

Note: Extra bricks are suggested for open-ended questions.

Note: Using a base plate will help keep the bricks in a uniform line. One base plate is suggested for these activities.



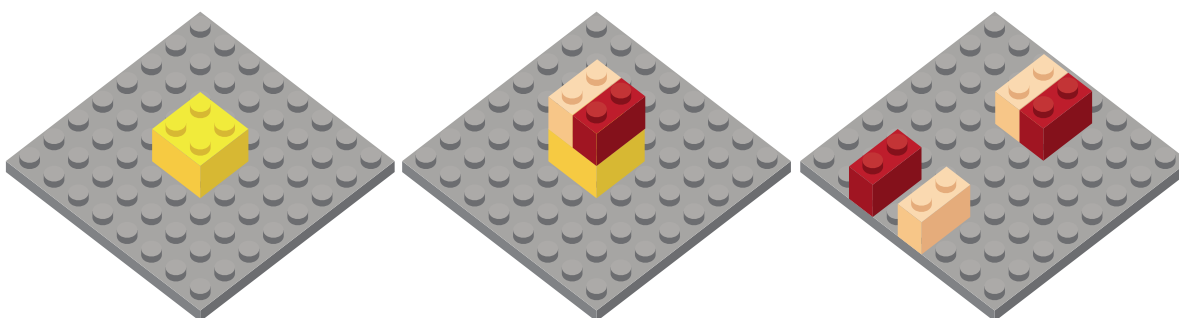
## Part 1: Show Them How

1. Place a 2x2 brick on a base plate. Count the studs (4).

Ask students to find two bricks that can be placed on top of the studs and cover them completely (two 1x2 bricks).

Explain that this model shows that 4 can be divided into 2 sets (the bricks), and each set has 2 studs.

Demonstrate how to write a division sentence for this model:  $4 \div 2 = 2$ .



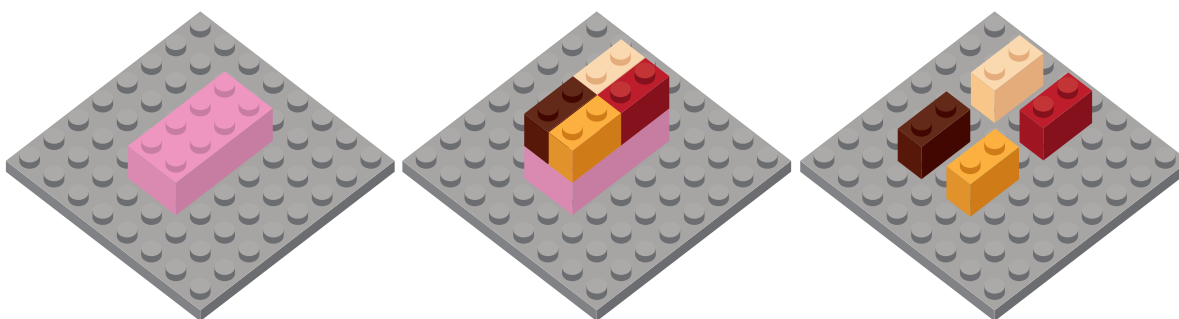
2. Place a 2x4 brick on a base plate. Count the studs (8).

Ask students to find four bricks that can be placed on top of this brick with no studs uncovered (four 1x2 bricks).

Ask students what this model shows about these numbers.

(*Answer:* The model shows the number of sets is 4 and the number in each set is 2.)

Demonstrate how to write a division sentence for this model:  $8 \div 4 = 2$ .



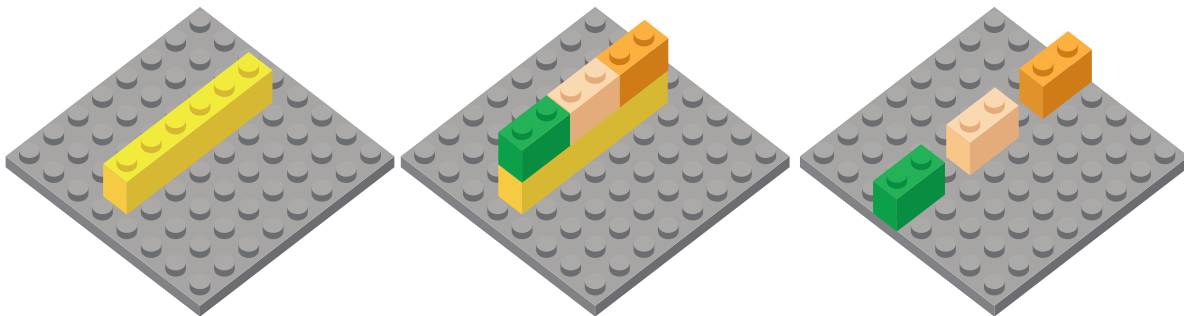


3. Place a 1x6 brick on a base plate. Count the studs (6).

Ask students to find three bricks that fit on top of this brick with no studs left over (three 1x2 bricks).

Ask students what this model shows. (Answer: 6 divided into 3 sets with 2 in each set.)

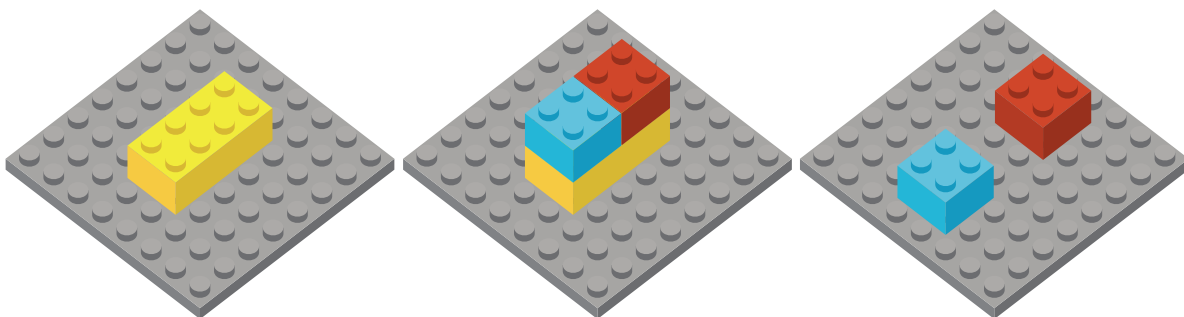
Demonstrate how to write a division sentence for this model:  $6 \div 3 = 2$ .



## Part 2: Show What You Know

1. Place a 2x4 brick on a base plate. What whole is being modeled? Find two bricks that fit on top without any left over studs. Decompose the whole into those sets. Draw your model. Write a sentence about your solution, using both words and a division sentence.

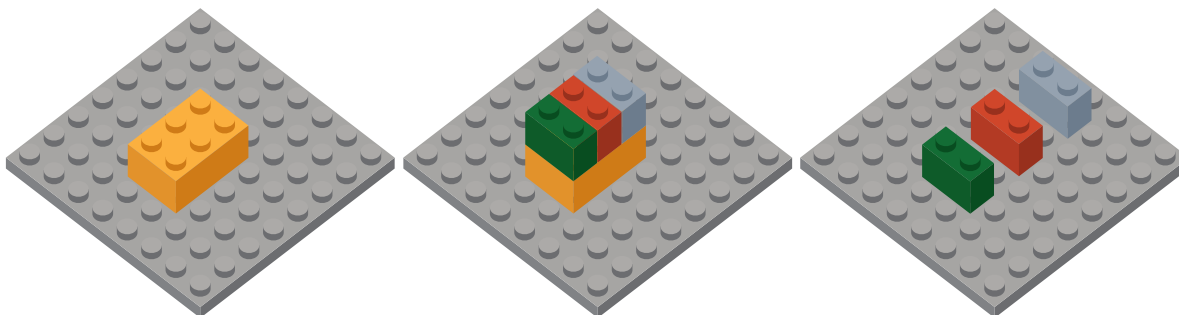
*Answer:* The whole is 8. The solution is 8 divided into 2 sets with 4 in each set; the division sentence is  $8 \div 2 = 4$ .





- 2.** Place a 2x3 brick on a base plate. What whole is being modeled? Find three bricks that fit on top of the model without any studs left over. Draw and explain your model using both words and a division sentence.

*Answer:* The whole is 6. The solution is 6 is divided into 3 sets with 2 in each set; the division sentence is  $6 \div 3 = 2$ .



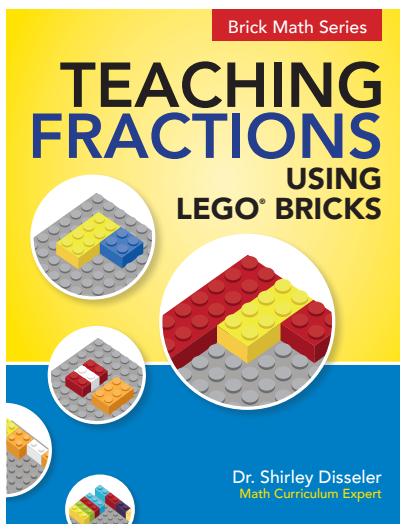
- 3.** Model a whole with a brick of your choice. Decompose it into sets, showing two ways to divide it. For each way of dividing the whole, how many sets are there and how many are in each set? Draw and explain your solutions using both words and division sentences.

Solutions will vary.

**Also in the Brick Math Series:**

# TEACHING FRACTIONS USING LEGO® BRICKS

Dr. Shirley Disseler



Teaching and learning fractions is easy using LEGO® bricks!

Teachers as well as parents can follow the step-by-step instructions to guide students as they learn to recognize fractions, to add and subtract fractions, and to find factors and equivalent fractions. Students model hands-on math problems with LEGO® bricks to develop true understanding of the concepts of fractions.

Math is fun when you're using LEGO® bricks to learn!

Author Dr. Shirley Disseler is Associate Professor at High Point University and Chair of the Department of Elementary and Middle Grades Education. She serves on the LEGO® Education Ambassadors Panel.

## **Companion student edition:**

### **LEARNING FRACTIONS USING LEGO® BRICKS**

Individual student book that follows the teacher's curriculum, complete with additional activities for practice and assessments.

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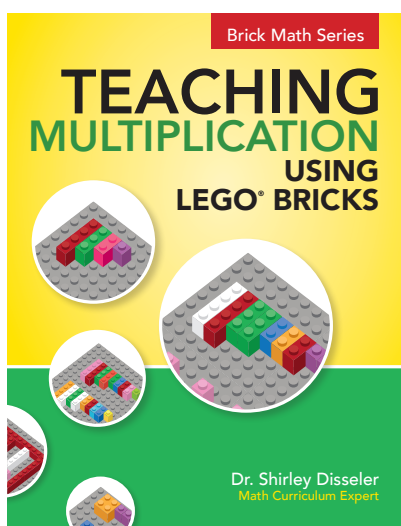




**Also in the Brick Math Series:**

# TEACHING MULTIPLICATION USING LEGO® BRICKS

Dr. Shirley Disseler



Teaching and learning multiplication is easy using LEGO® bricks!

Teachers as well as parents can follow the step-by-step instructions to guide students as they learn multiplication facts, one-digit multiplication, and two-digit and larger multiplication. Students model hands-on math problems with LEGO® bricks using a variety of techniques—sets, arrays, and place values—to develop true understanding of the concepts of multiplication.

Math is fun when you're using LEGO® bricks to learn!

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## 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 Division Using LEGO® Bricks*

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