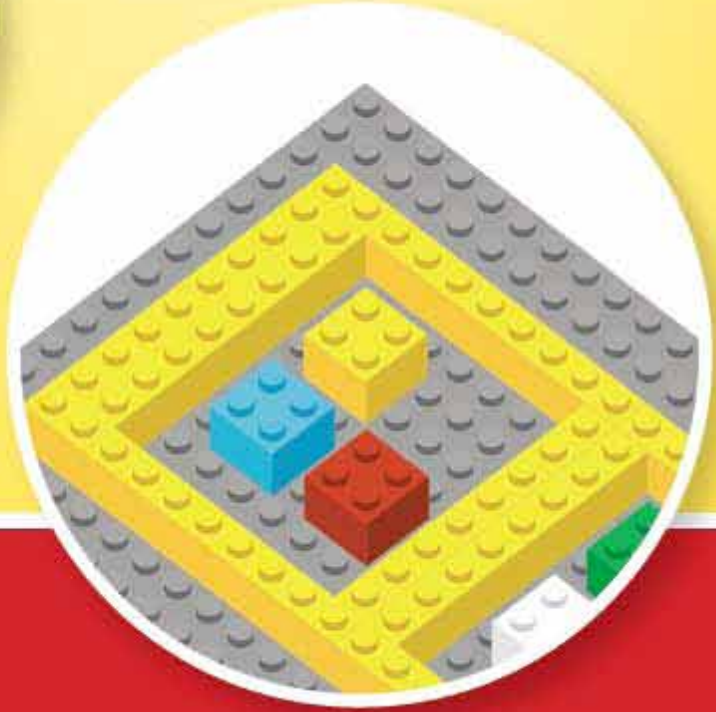
Brick Math Series

TEACHING DIVISION USING LEGO® BRICKS



Dr. Shirley Disseler
Math Curriculum Expert

Brick Math Series

TEACHING DIVISION USING LEGO® BRICKS

Dr. Shirley Disseler

COMPASS

DIVIDING LARGER NUMBERS

Students will learn/discover:

- How to use place value to divide with larger numbers
- The meaning of *remainder*

Why is this important?

Students need to understand the concept of dividing larger numbers, not simply know how to perform the operations by rote. If they are able to relate larger numbers to place value, students improve their ability to do mental math and estimate. They learn to apply division to real-world uses for math, such as when purchasing items. For example, when purchasing a six-pack of soda for $3.50 and sharing the cost with 5 others, they will use division to find the cost per soda.

This activity uses a strategy of modeling with the bricks representing place value. This modeling technique is different from the techniques used earlier in this book for simpler division problems.

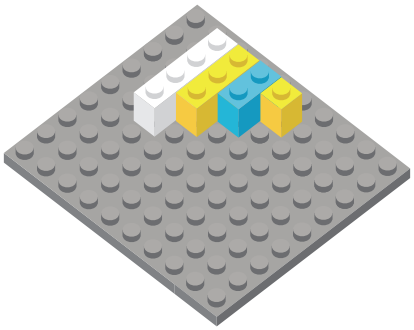
Brick Math journal:

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 LEGO® bricks helps to reinforce the concepts and engages both the creative and logical thinking processes.

SUGGESTED BRICKS

Size	Number
1x1	24
1x2	24
1x3	24
1x4	8

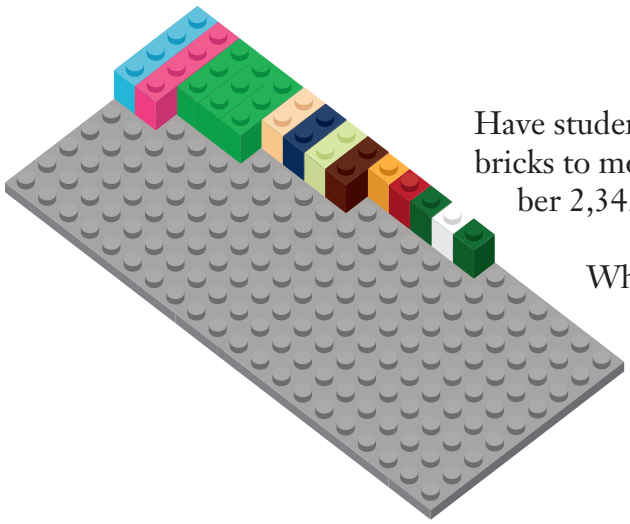
Note: Using a base plate will help keep the bricks in a uniform line. One large base plate is suggested for these activities.



Part 1: Show Them How #1

To model division of larger numbers, students must first relate the bricks to place value.

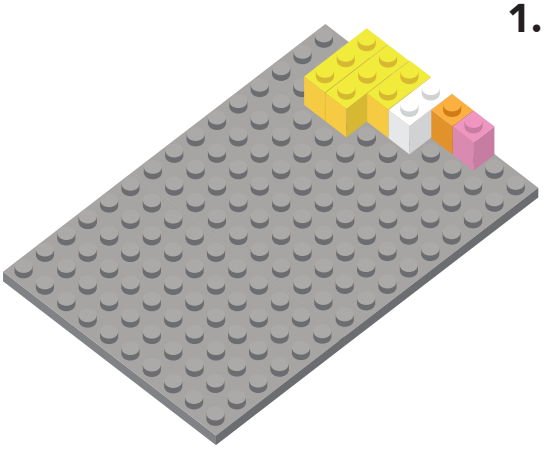
This modeling technique shows the ones place with a 1x1 brick, the tens place with a 1x2 brick, the hundreds place with a 1x3 brick, and the thousands place with a 1x4 brick.



Have students build several numbers to practice using bricks to model place value. For example, model the number 2,345 with bricks representing place value.

When students understand how to model numbers using this place value method, use this technique to model division of larger numbers.

Division of larger numbers (no remainder)

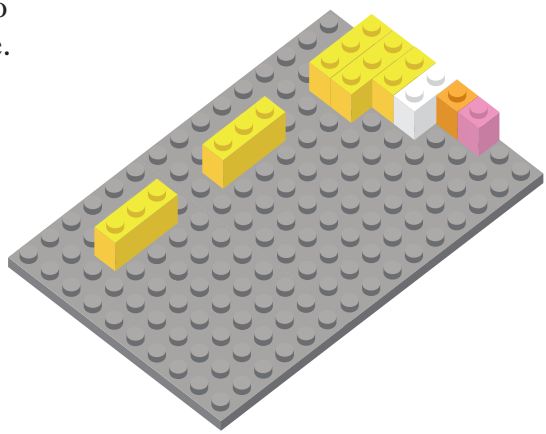


1. Build the number 222 using the place value method. Have students draw their models in their Brick Math journals.

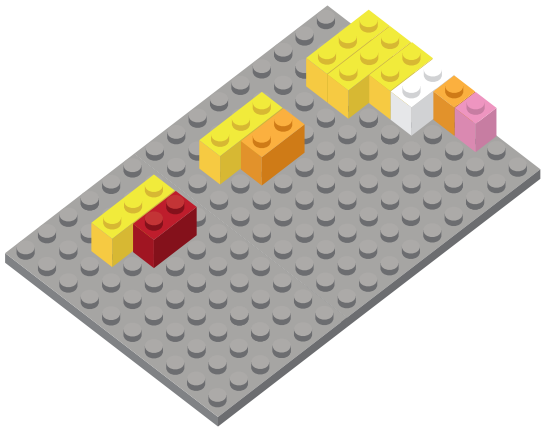
2. Tell students that the divisor is 2 and that they need to find the quotient using the bricks to model the partitive division process of equal shares, with the number of groups unknown.

Ask students to write a division sentence for the problem. (*Answer:* The problem is 222 ÷ 2 = □.)

3. Place one 1x3 brick (representing 100) in each of two sets. Students can create set frames if they would like.

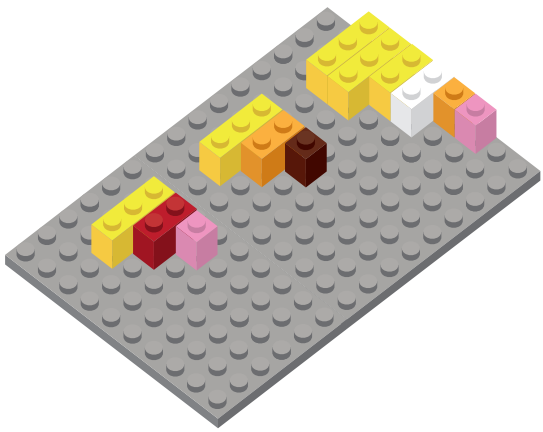


4. Divide the tens by placing one 1x2 brick (representing 10) in each set.



5. Distribute the 1x1 bricks (each representing 1) evenly into each set.

Each set contains 100 + 10 + 1 = 111, so the quotient is 111.

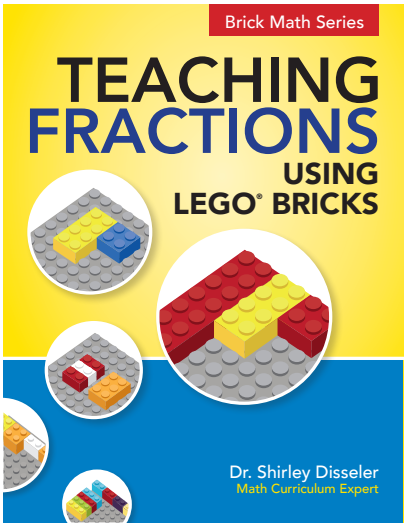


6. Have students draw their models and explain them in their Brick Math journals.

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:

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

Available on Amazon and at compasspublishing.org.

Quantity pricing and classroom packs available at 802-751-8802 or neil@compasspublishing.org.

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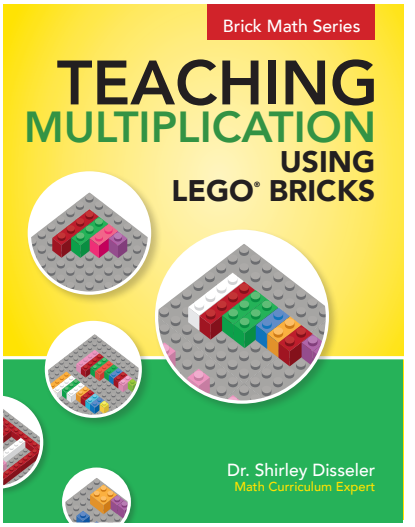
Also in the Brick Math Series:

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 "oooh, 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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