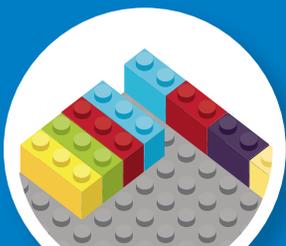
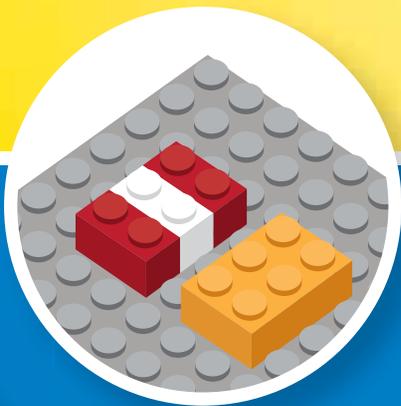


Brick Math Series

TEACHING FRACTIONS

USING LEGO® BRICKS



Dr. Shirley Disseler
Math Curriculum Expert

Brick Math Series

TEACHING FRACTIONS USING LEGO® BRICKS

Dr. Shirley Disseler





BENCHMARK FRACTIONS

Students will learn/discover:

- Values of the benchmark fractions: $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$
- Fractions can be made with different wholes

Why is this important?

Students start by understanding the simple benchmark fractions that they will see over and over again. Benchmark fractions better prepare students to make estimates of measurements, distances, and amounts of wholes in real-life situations.

Students must also understand that fractions can be made from many different wholes.

Definition: Different wholes

All wholes are not equal. One-eighth of a 14-inch large pizza is not the same size piece as one-eighth of an 8-inch small pizza. The fractional amount may be the same, but if the fraction comes from different sized wholes, the fractions are not equal.

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 instructions). Recording the models on paper after building with the LEGO® bricks helps to reinforce the concepts.

SUGGESTED BRICKS

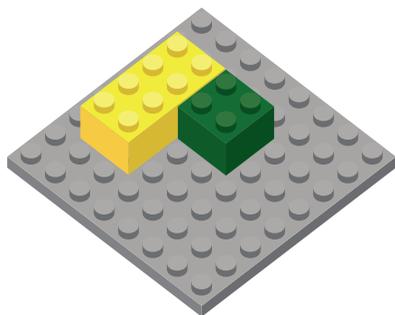
Size	Number
1x1	4
1x2	6-8
1x4	4-6
2x2	4-6
2x4	9-12
2x8	2

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 Model benchmark fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{3}{4}$

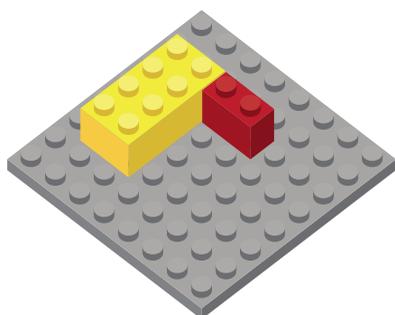
1. Place the 2x4 brick on the base plate. This is the whole. Remind students that this represents the “denominator” of the fraction. The denominator is the whole that is being divided into parts. It is the bottom number in a fraction.



2. Find $\frac{1}{2}$ of this whole. Look for two bricks that are the same size that take up the same space as the whole when they are placed together. One of these bricks equals $\frac{1}{2}$.

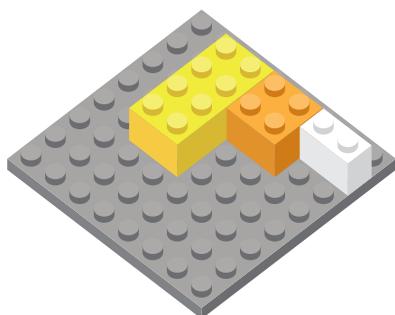
(Answer: one 2x2 brick)

The four-stud brick (2x2) is one-half the eight-stud brick (2x4). The 4 is the “numerator” in the fraction. In a fraction this would be the top number. Since 4 is half of 8, this fraction can be written as $\frac{4}{8}$ or $\frac{1}{2}$.



3. Find $\frac{1}{4}$ of the whole. Look for four bricks that are the same size that take up the same space as the whole when placed together. One of these bricks equals $\frac{1}{4}$.

(Answer: one 1x2 brick)



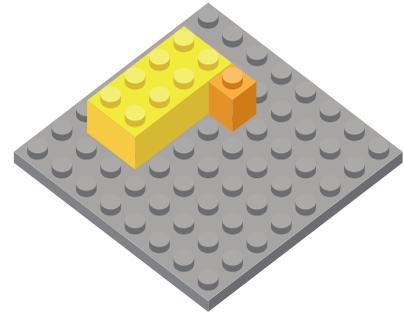
More for students to discover:

Demonstrate that $\frac{1}{4}$ is equivalent to $\frac{1}{2}$ of the half found in step 2.



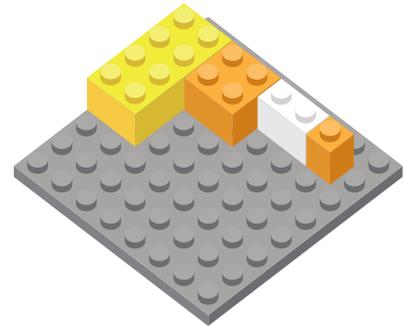
4. Find $\frac{1}{8}$ of the whole. Look for eight equal-sized bricks that take up the same space as the whole when placed together. One of these bricks equals $\frac{1}{8}$.

(Answer: one 1x1 brick)



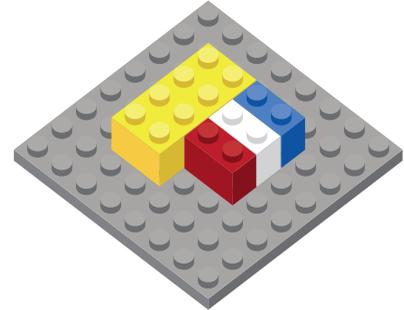
More for students to discover:

Demonstrate that this 1x1 brick is equivalent to $\frac{1}{2}$ of the $\frac{1}{4}$ in step 3.



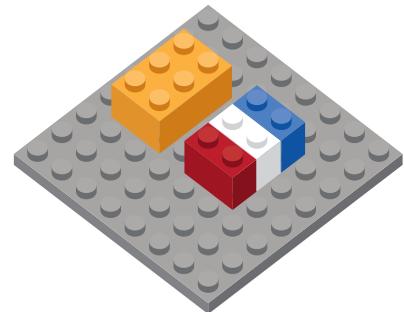
5. Find $\frac{3}{4}$ of the whole. Look for the brick that made $\frac{1}{4}$, then find three of them.

(Answer: three 1x2 bricks)



More for students to discover:

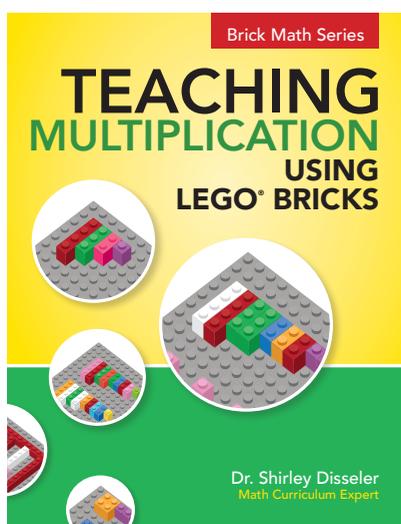
Demonstrate that three 1x2 bricks are equivalent to one 2x3 brick.



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!

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.



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 Fractions Using LEGO® Bricks

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