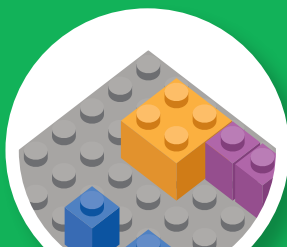
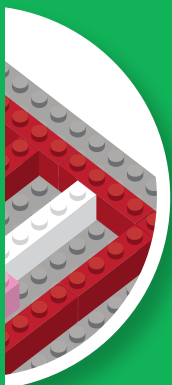
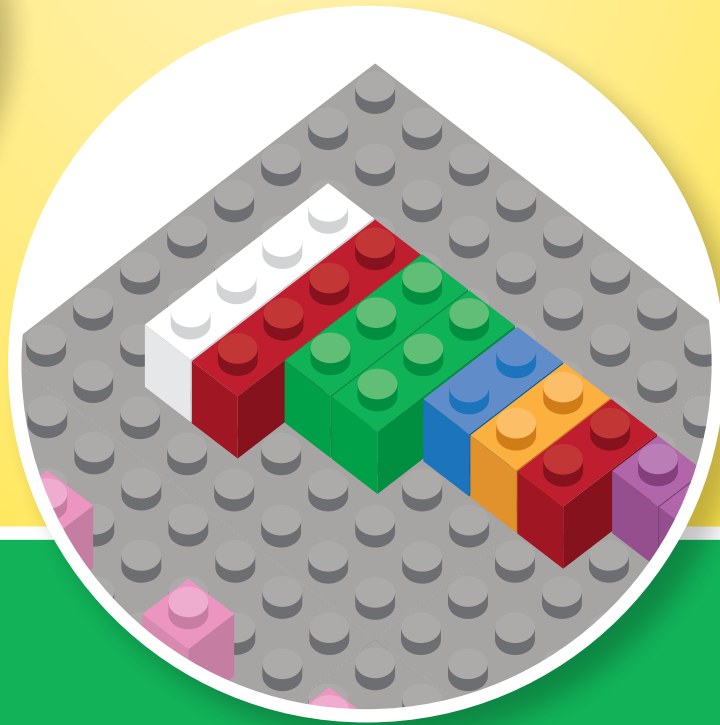
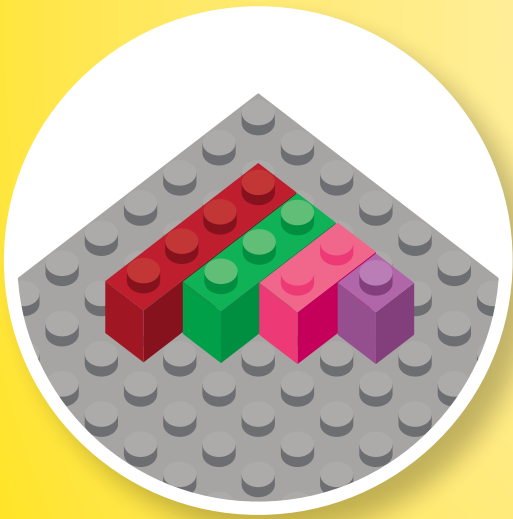


TEACHING MULTIPLICATION USING LEGO® BRICKS



Dr. Shirley Disseler
Math Curriculum Expert

Brick Math Series

TEACHING MULTIPLICATION USING LEGO® BRICKS

Dr. Shirley Disseler





FINDING FACTORS

Students will learn/discover:

- The meaning of the term “factors”
- How to find all the factors of numbers
- How to make models of factor families
- Vocabulary:
 - **Factors:** Factors are numbers you can multiply together to get another number. Example: 2 and 3 are factors of 6; 2 and 4 are factors of 8.

Why is this important?

Students need to be able to identify all the factors of numbers before they can work on Least Common Multiples and Greatest Common Factors. Understanding the link between multiplication facts and division facts is crucial for students to prepare for upper levels of math, such as fractions. Knowing fact families and factors will help when learning to multiply larger numbers and will help with understanding division, which is often taught simultaneously with multiplication.

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 more about the Brick Math journal). Recording the models on paper after building with the LEGO® bricks helps reinforce the concepts.

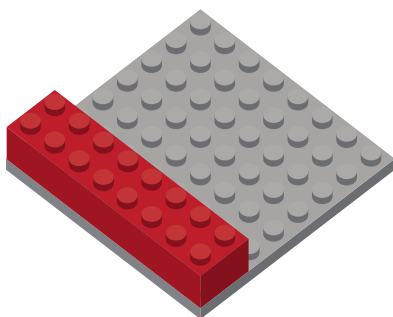
SUGGESTED BRICKS

Size	Number
1x1	20
1x2	6-8
1x4	4-6
1x16	2
2x2	4-6
2x4	9-12
2x8	2

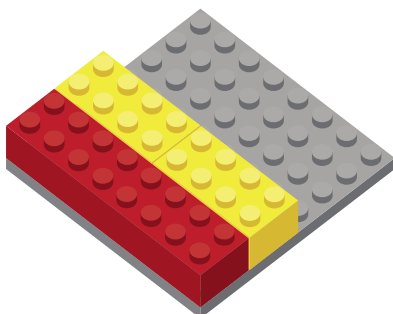
Note: Using a base plate will help keep the bricks in a uniform line. One base plate is suggested for these activities.



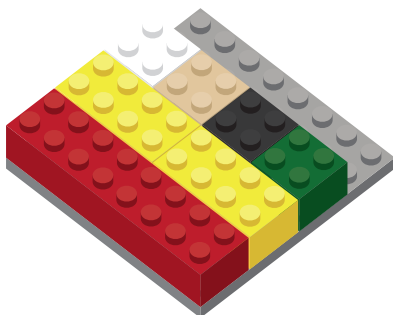
Part 1: Show Them How Model how to find all the factors of 16



1. Place a 2x8 brick or a 1x16 brick on a base plate.



2. Place two bricks that are the same and, when placed next to the 16-stud brick, are equivalent in size and show two halves of the 16-stud brick. Use two 2x4 bricks or two 1x8 bricks.

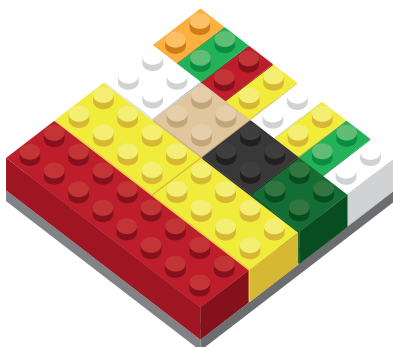


3. Ask students: Can you find three bricks of equal size equivalent to the size of the 16-stud brick?

Let students look and think, and discover that the answer is no.

4. Ask students: Can you find four bricks of equal size equivalent to the size of the 16-stud brick?

Let students look and think, and discover that the answer is four 2x2 bricks or four 1x4 bricks.



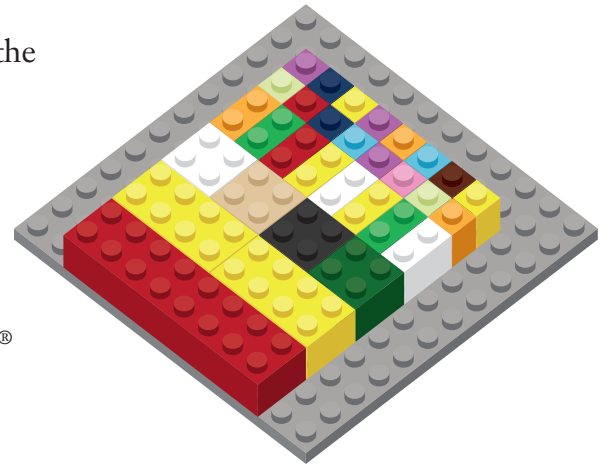
5. Ask students: Can you find the next number of equal-sized bricks that are equivalent to the size of the 16-stud brick?

Let students discover that five, six, and seven bricks don't work. Let them discover that the answer is eight 1x2 bricks.



6. Ask students: Can you find the next number of equal-sized bricks that are equivalent to the size of the 16-stud brick?

Let students discover that the answer is sixteen 1x1 bricks.



7. Name all the factors of 16 by looking at the LEGO® bricks on the base plate.

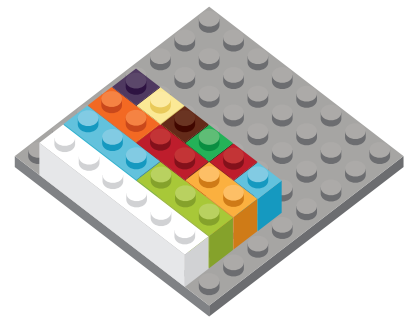
Answer: 16, 8, 4, 2, and 1.

Part 2: Show What You Know

1. Can you build a model to show all the factors of 6?

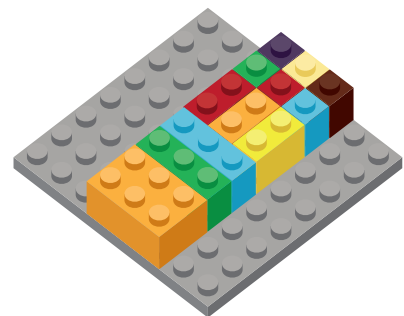
Solution A:

This model is a possible solution, showing factors 6, 3, 2, and 1.



Solution B:

This model uses a different combination of bricks. Students who create this model could also explain that there are 2 sets of 3 in 6, and 3 sets of 2 in 6.



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

Copyright ©2016 by Shirley Disseler
Published by Brigantine Media/Compass Publishing
211 North Avenue, St. Johnsbury, Vermont 05819

Cover and book design by Anne LoCascio
Illustrations by Curt Spannraft
All rights reserved.

Your individual purchase of this book entitles you to reproduce these pages as needed for your own classroom use only. Otherwise, no part of this book may be reproduced or utilized in any way or by any means, electronic or mechanical, including photocopying, recording, or information storage or retrieval system, without prior written permission from the publisher. Individual copies may not be distributed in any other form.

Brigantine Media/Compass Publishing
211 North Avenue
St. Johnsbury, Vermont 05819
Phone: 802-751-8802
Fax: 802-751-8804
E-mail: neil@brigantinemedia.com
Website: www.compasspublishing.org

LEGO®, the LEGO® logo, and the Brick and Knob configurations are trademarks of the LEGO® Group, which does not sponsor, authorize, or endorse this book. All information and visual representations in this publication have been collected and interpreted by its author and do not represent the opinion of the LEGO® Group.

ORDERING INFORMATION

Quantity sales

Special discounts for schools are available for quantity purchases of physical books and digital downloads. For information, contact Brigantine Media at the address shown above or visit www.compasspublishing.org.

Individual sales

Brigantine Media/Compass Publishing publications are available through most booksellers. They can also be ordered directly from the publisher.
Phone: 802-751-8802 | Fax: 802-751-8804
www.compasspublishing.org
ISBN 978-1-9384065-5-3