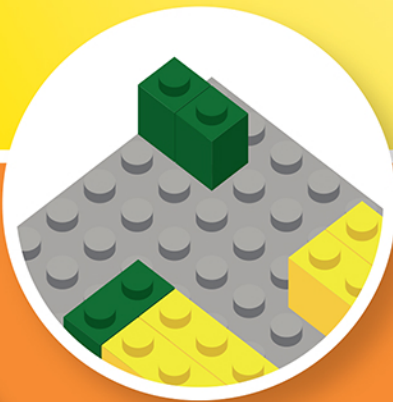
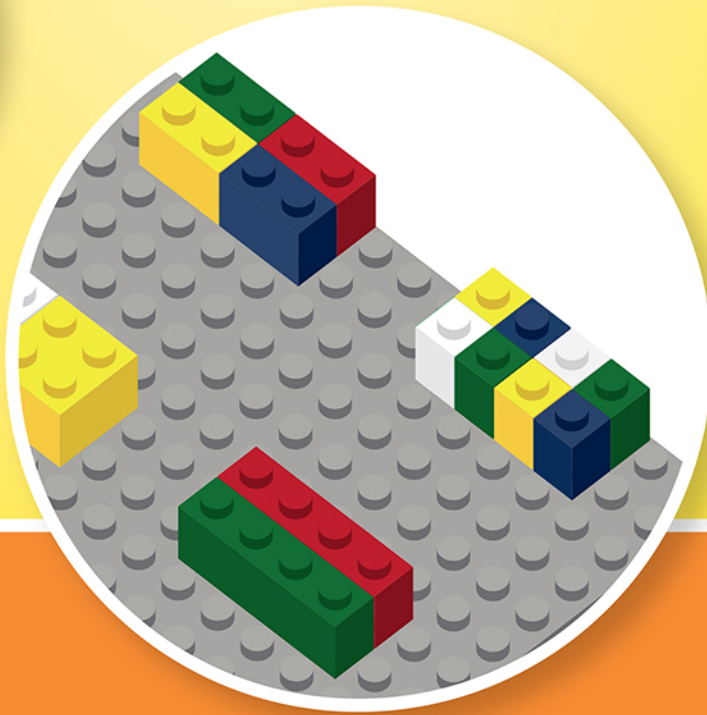
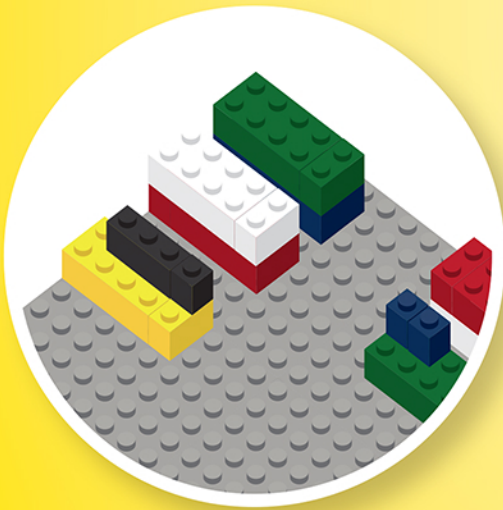


Brick Math Series

# TEACHING ADDITION USING LEGO® BRICKS



Dr. Shirley Disseler  
Math Curriculum Expert

Brick Math Series

# TEACHING ADDITION USING LEGO® BRICKS

Dr. Shirley Disseler



## *Teaching Addition Using LEGO® Bricks*

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# CONTENTS

**Introduction** . . . . . 5

**How to Teach with the Brick Math Series** . . . . . 7

**Chapter 1: What Does It Mean to Add?** . . . . . 11

**Chapter 2: How Many Ways?** . . . . . 18

**Chapter 3: Ten-Frames Addition within Twenty** . . . 22

**Chapter 4: Place Value Addition** . . . . . 28

**Chapter 5: Decomposing Numbers** . . . . . 33

**Chapter 6: *Result Unknown* Problems** . . . . . 42

**Chapter 7: *Change Unknown* Problems** . . . . . 48

**Chapter 8: *Start Unknown* Problems** . . . . . 57

**Chapter 9: Adding Larger Numbers** . . . . . 63

**Appendix** . . . . . 67

- Suggested Brick Inventory
- Student Assessment Chart
- Baseplate Paper

# WHAT DOES IT MEAN TO ADD?

## Students will learn/discover:

- The definition of *addition*
- What it means to add two numbers
- How to combine sets

## Why is this important?

Being able to model addition and understand what it means to add will serve as a model for combining sets in multiplication. Formulating an understanding of basic addition helps students with place value when adding larger numbers.

## Vocabulary:

- Add: To join or combine sets
- Sum: The combined total of two or more sets
- Addend: Terms in an addition problem
- Plus: A symbol of math that denotes addition
- Set: An individual amount with a common characteristic; one amount

## How to use the companion student book, *Learning Addition Using LEGO® Bricks*:

- After students build their models, have them draw the models and explain their thinking in the student book. Recording the models on paper after building them with bricks helps reinforce the concepts being taught.
- Discuss the vocabulary for each lesson with students as they work through the student book.
- Use the assessment in the student book to gauge student understanding of the content.

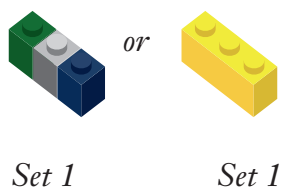
## SUGGESTED BRICKS

Size	Number
1x1	20
1x2	10
1x3	8
1x4	8
1x6	4
1x10	4
2x2	8
2x3	6
2x4	6
2x6	4

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



## Part 1: Show Them How



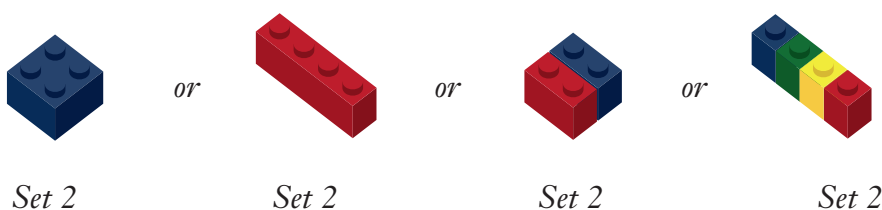
1. Build a model of the number 3 using either three 1x1 bricks or one 1x3 brick. Have students build their own models.

Ask students what number the model represents and how they know. Students should understand that counting each stud one-to-one shows 3 studs.

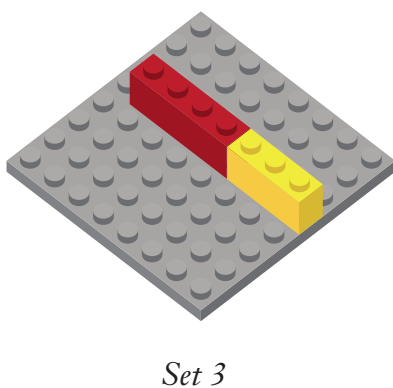
Have students draw the model and label it *Set 1*. Explain that a *set* is represented by a group of studs that model one number.

2. Build another model that shows the number 4. You can do this in four different ways: four 1x1 bricks, two 1x2 bricks, one 1x4 brick, or one 2x2 brick. Have students make their own models.

Have students draw their models and label them *Set 2*.



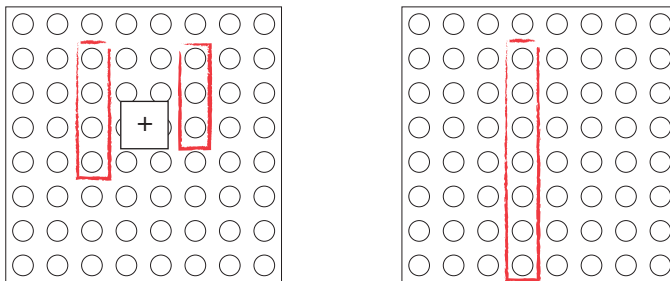
3. Ask students what would happen if one set of studs from Set 1 (representing the number 3) and one set of studs from Set 2 (representing the number 4) were combined. Students should answer that there would be 7 studs in the group. Have students build the solution model to prove the answer.



Have students draw their solution model and label it *Set 3*.



Explain that Set 3 represents the *sum* in the problem and that Sets 1 and 2 represent the *addends*. Show students a drawing of the brick model with the brick sets separated slightly, with a box between them that has an addition symbol in it.



Explain to students that the box between sets 1 and 2 is where we show the action of the math, using the addition symbol (+). Tell students that although this is sometimes called a “plus sign,” it’s better to name it using the action of the math—addition.

*Note:* Be careful not to call the *addition symbol* the “plus sign,” because it is not always referred to with that terminology. This can cause vocabulary issues on standardized tests.

Show students how to write a mathematical statement for their model:  $3 + 4 = 7$

Have students write the mathematical statement.

4. Review the terms *set*, *add*, *addend*, and *sum* using the models.

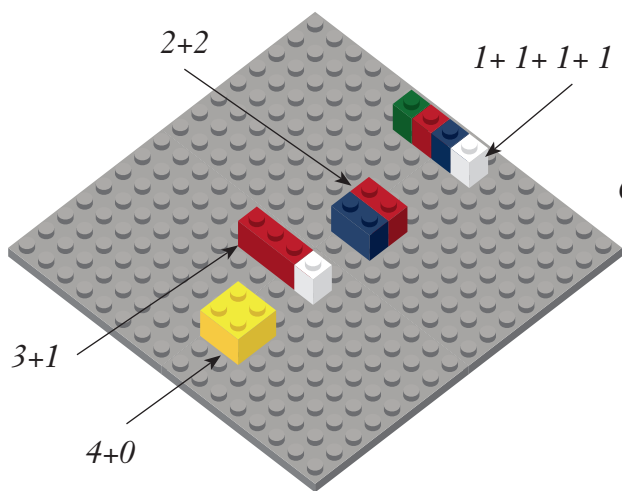
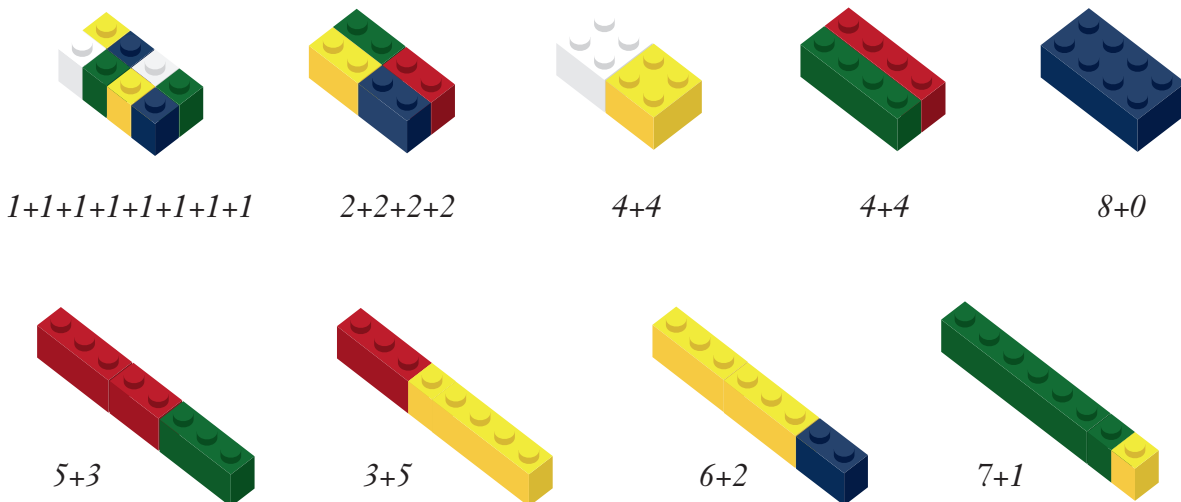


5. Have students build a model of the number 8 using studs. Remind students that they are counting studs, not bricks.

Build a model of the number 8. Show students your model and ask how their models are like yours and different from yours. Remind them that 8 can be made many ways and list some of them ( $3 + 5$ ;  $4 + 4$ ;  $7 + 1$ ;  $6 + 2$ ,  $3 + 5$ , etc.)

Have students draw their models of 8.

*Possible models*



*Possible models*

6. Have students build a model of 4.

Have students draw their models of 4 on the same baseplate paper with their drawing of 8.

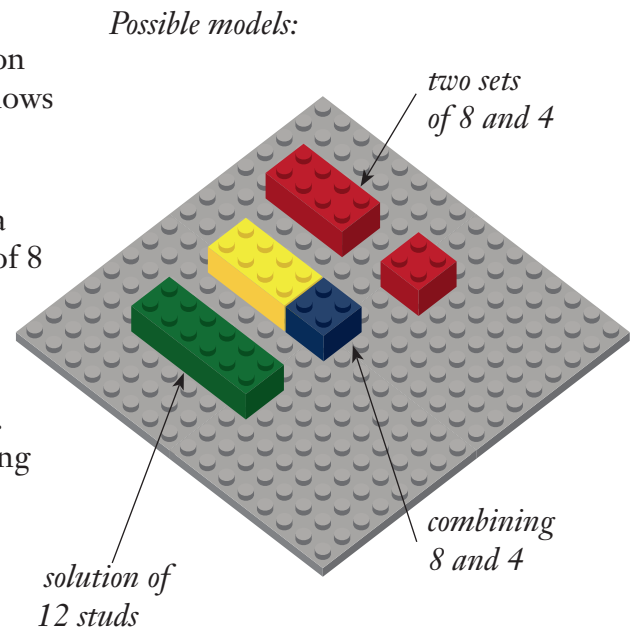




7. Have students draw a box between the drawings of the two sets that show 8 and 4, and then place the addition symbol in the box. Ask students what the addition symbol means. Students should understand that it shows combining the two numbers or sets into one set.

Have students combine the two numbers and make a model that shows the solution or the *sum*. The sum of 8 and 4 is 12. Have students draw their model.

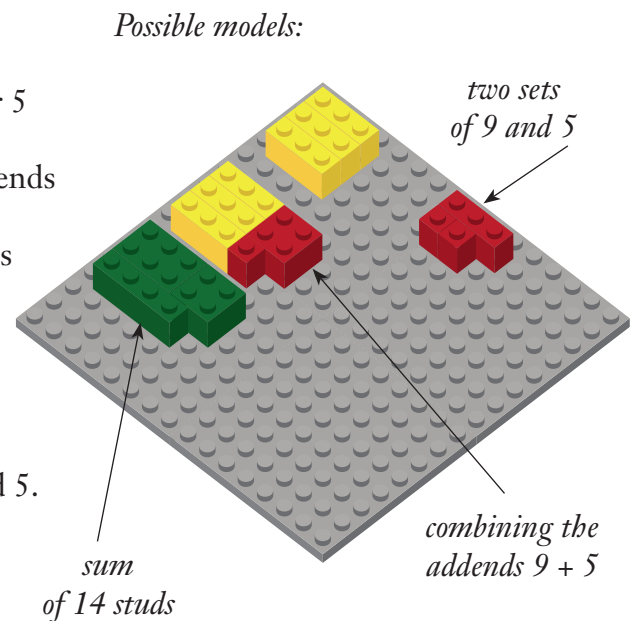
Have students write a mathematical sentence for the addition problem. Students should write  $8 + 4 = 12$ . Have students describe or explain the action according to the steps.



8. Have students model the problem  $9 + 5 = \underline{\quad}$  using the following steps:

- Build the number 9 with studs and build the number 5 with studs and draw the model
- Place the appropriate math symbol between the addends in the drawing
- Build a model that shows the sum of the two addends and draw the model
- Describe the model

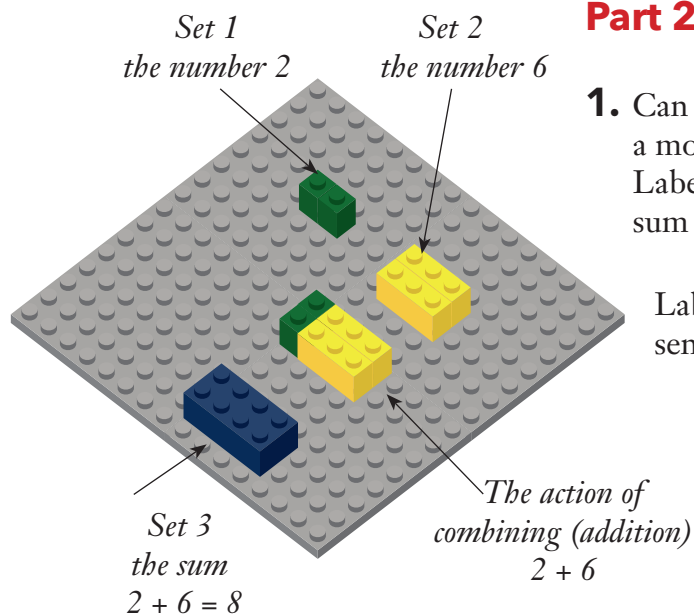
Student should show this level of understanding: “This model shows a set of 9 and a set of 5 added together to get 14. The sum is 14. Addends are 9 and 5. Adding means to put together in one set.”





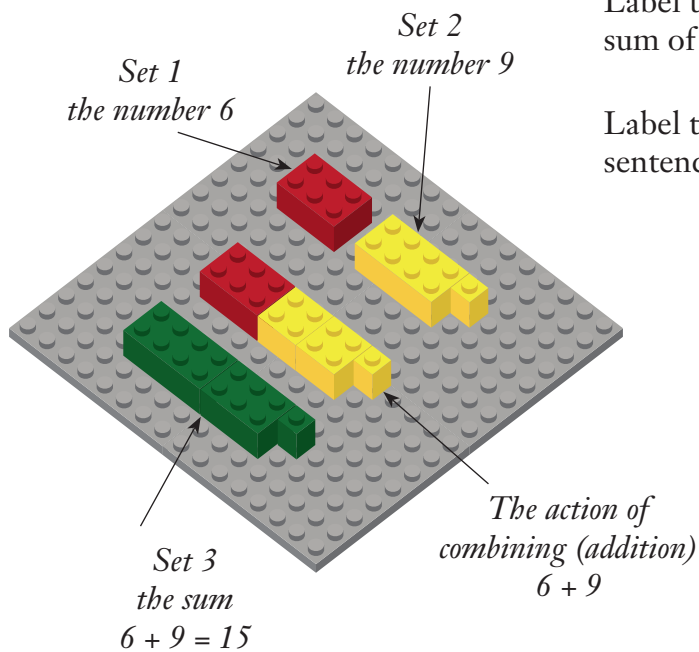
## Part 2: Show What You Know

1. Can you build a model that shows the number 2 and a model that shows the number 6? Draw your model. Label the numbers *Set 1* and *Set 2*. Build *Set 3* as the sum of *Sets 1* and 2.



Label the parts of the drawing and write a math sentence.

2. Can you build a model that shows the number 6 and a model that shows the number 9? Draw your model. Label the numbers *Set 1* and *Set 2*. Build *Set 3* as the sum of *Sets 1* and 2.

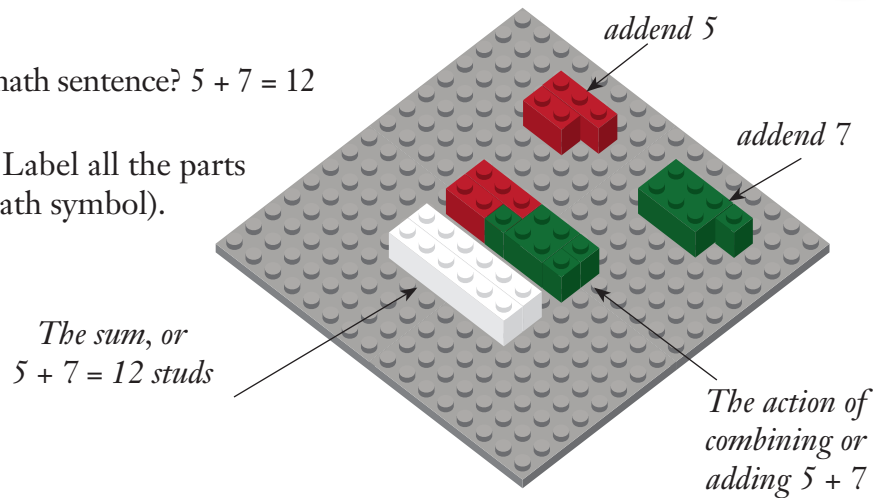


Label the parts of the drawing and write a math sentence.



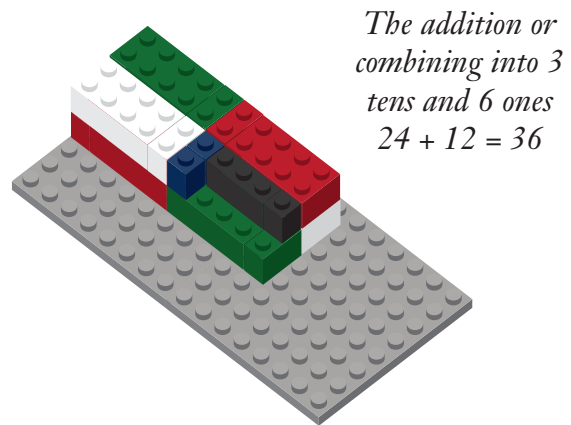
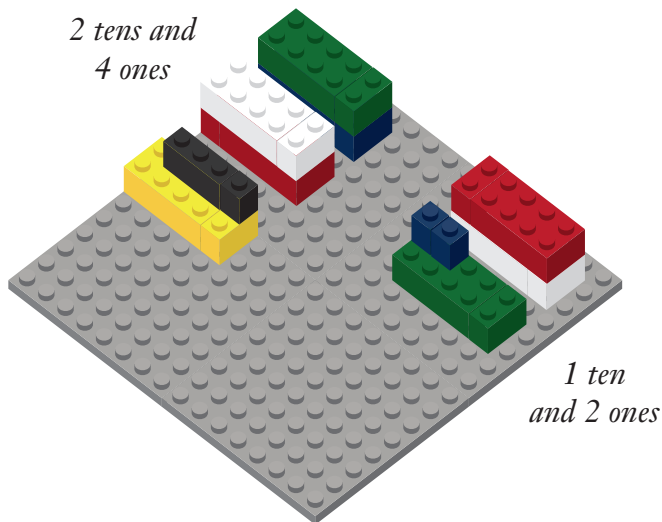
3. Can you build a model for this math sentence?  $5 + 7 = 12$

Draw and explain your model. Label all the parts of the model (addends, sum, math symbol).



4. Can you build a model that shows 2 tens and 4 ones added to 1 ten and 2 ones? What is the sum? Show how you found the sum. Draw and explain your model. Write a math sentence for your model.

*Note:* The model illustrated is a ten-frame model, but more advanced students may use a place value model.

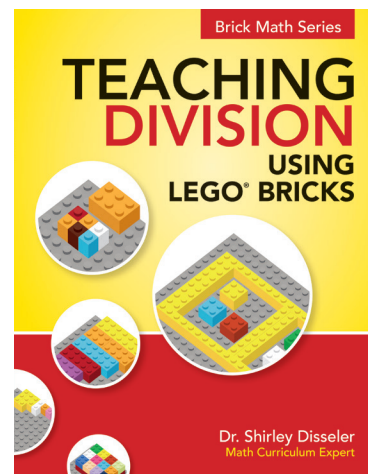
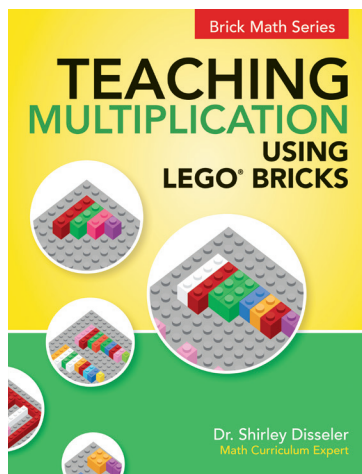
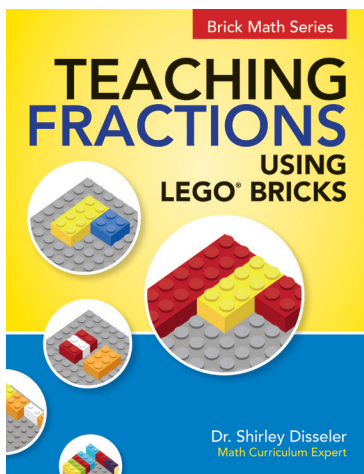
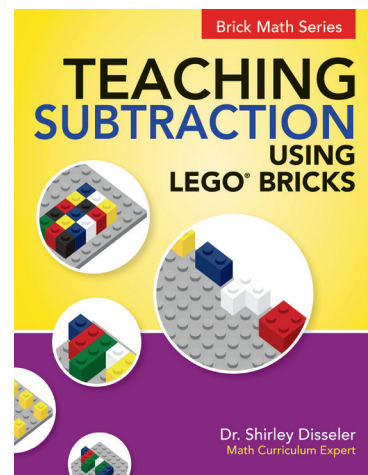
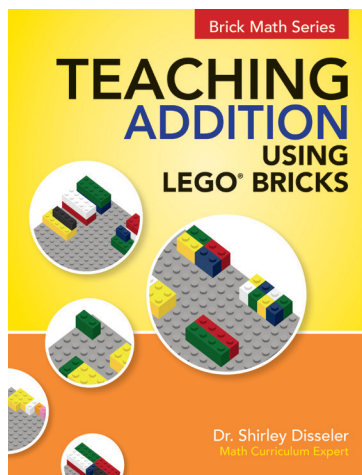
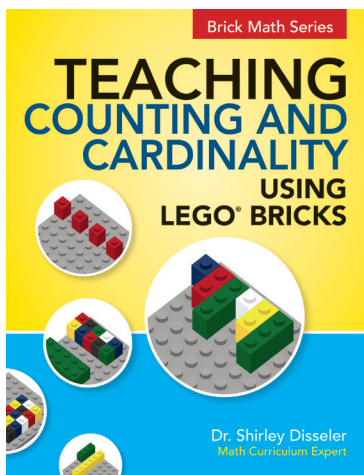


### Challenge:

Build a model of an addition problem. Do not include the sum in the model. Find a partner and exchange problems. Solve your partner's problem. After you have both completed the problems, discuss your solutions and make sure you can explain the model. Draw your partner's models and your solution to the model. Explain your solution in writing.

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