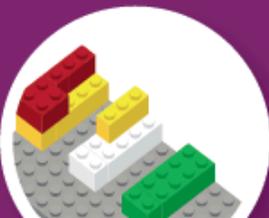
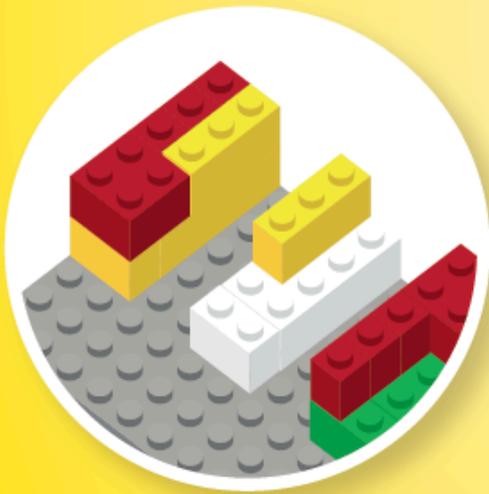


Brick Math Series

TEACHING SUBTRACTION USING LEGO® BRICKS



Dr. Shirley Disseler
Math Curriculum Expert

Teaching Subtraction Using LEGO® Bricks

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RESULT UNKNOWN PROBLEMS WITHIN 20

Students will learn/discover:

- How to represent and solve subtraction problems that are missing the difference
- How to write mathematical equations for models

Why is this important?

Being able to represent and solve problems with missing parts in different locations helps students begin to understand the part-part-whole relationships between numbers. They learn to recognize the relationship between addition sums and subtraction differences as opposite.

Vocabulary:

- Result unknown: Missing difference term in a subtraction problem
- Minuend: Largest number (and usually the first number) in a subtraction problem; the number that the subtrahend is subtracting from
- Subtrahend: Smaller of two numbers (and usually the second number) in a subtraction problem; the number that is being subtracted from the minuend
- Difference: Solution to a subtraction problem
- Minus: Symbol in a subtraction problem
- Subtract: Move from the whole
- Take Away: Move from the whole

SUGGESTED BRICKS

Size	Number
1x1	10 each of 4 colors
1x2	6
1x3	6
1x4	6
1x10	6
2x2	6
2x3	6
2x4	6

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

Note: The bricks used in these exercises may vary depending on how students are able to count. For example, if students can see that the 1x3 brick is the same as three 1x1 bricks, they may use that brick to show the number 3.



How to use the companion student book, *Learning Subtraction 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.

Part 1: Show Them How

There are two different methods to model the solution of result unknown problems: the comparison method and the counting on method. Examples are included for each. *Note:* Although 1x10 strips are used here to model the comparison method and ten-frames are used here to model the counting on method, the 1x10 bricks and ten-frames are interchangeable as ways to show 10. Some students may not be developmentally ready to use 1x10 strips, so choose according to students' needs.

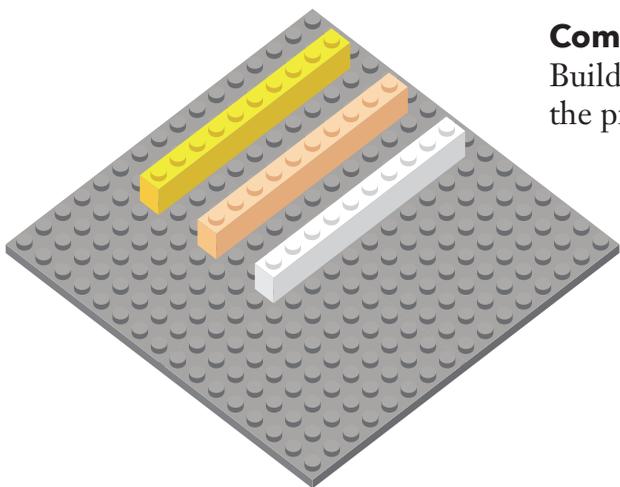
Problem #1: $7 - 3 = \square$

Be sure to discuss the vocabulary terms *minuend*, *subtrahend*, *difference*, and *result unknown*.

Ask students how to find the missing number (*difference*) that belongs in the box.

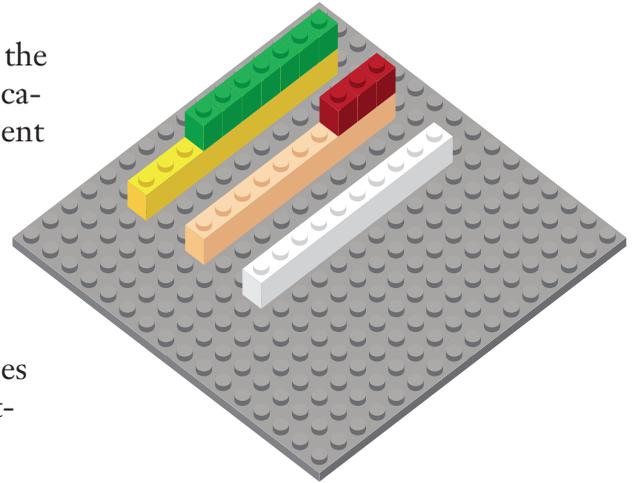
Comparison method (using three 1x10 strips):

Build three 1x10 strips to represent the three numbers in the problem (the *minuend*, *subtrahend*, and *difference*).



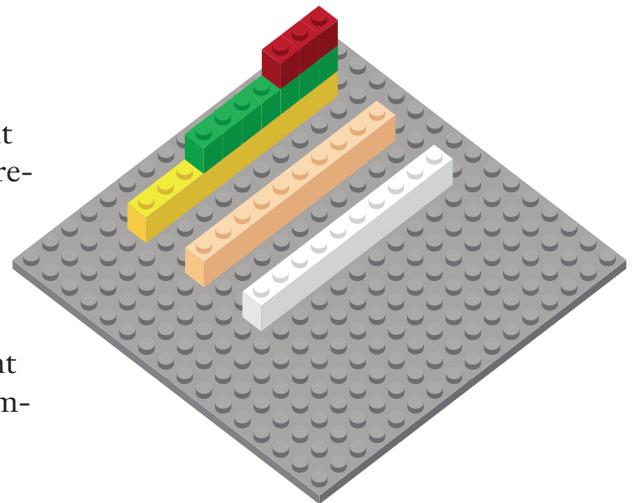


Place seven 1x1 bricks on the left strip to represent the *minuend* in the starting place. Place three 1x1 bricks on the center strip to represent the *subtrahend* in the change location. Do not place any studs on the right strip to represent the *difference*, which is unknown.

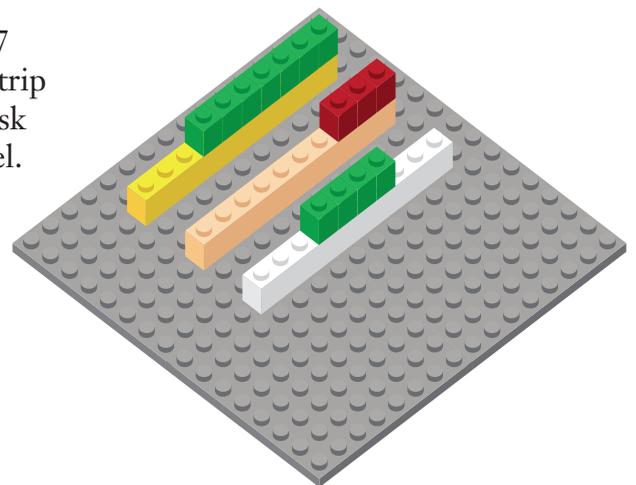


Ask students how to determine the missing number using subtraction strategies. Students could use strategies like counting up, one-to-one correspondence, part-part-whole, or matching to find the solution.

Have students put a finger on top of the 1x10 strip that shows the number being taken away or subtracted (the center strip). Use the vocabulary (the *subtrahend*). Count the number of studs on that strip using one-to-one correspondence. Explain that this number is in the change location and is the number that the minuend has to be reduced by to determine the difference or result unknown. Have students place the 3 studs from this strip on top of the 7 studs on the left strip that represent the minuend to find the difference. Students should compare to find 4 uncovered studs.



Have students model all the parts of the problem with 7 studs on the left strip (*minuend*), 3 studs on the center strip (*subtrahend*), and 4 studs on the right strip (*difference*). Ask students if they notice anything interesting in the model. Students should see that the studs on the right strip added to the studs on the center strip are equivalent to the studs on the left strip. Students who understand this are beginning to see the link between addition and subtraction.



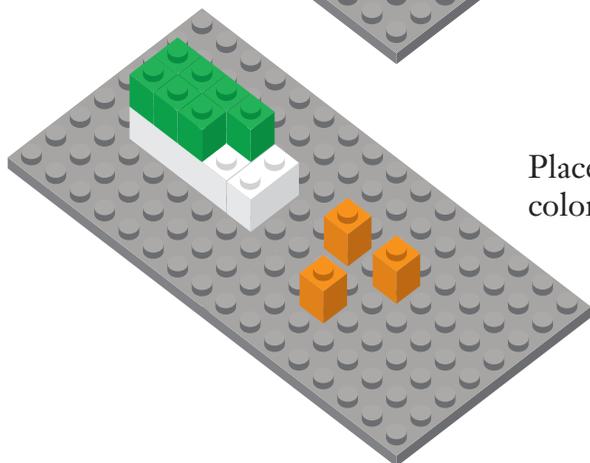
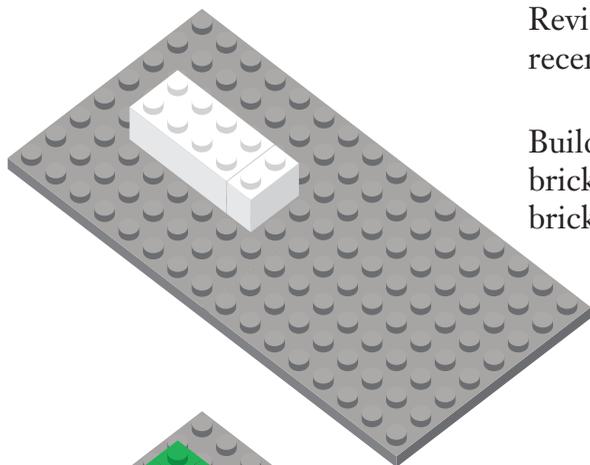


Have students draw the model, explain the parts of the problem, and write the math sentence. Students should be able to explain that the start number or minuend is 7 and the change number or subtrahend is 3. Covering the 7 studs on the left strip with 3 studs from the center strip leaves 4 studs uncovered. This shows the result unknown or difference of 4. Some students may understand that they can use addition to check by working backwards. $7 - 4 = 3$

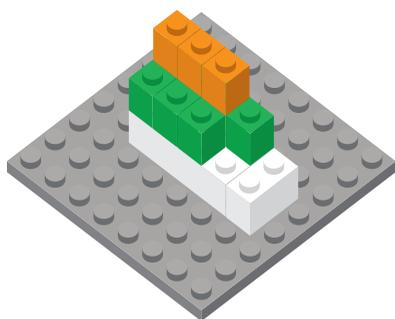
Counting on method (using one ten-frame):

Review of ten-frames: If students have not used ten-frames recently, review the strategy at the beginning of Chapter 2.

Build one ten-frame. Use either one 2x4 brick and one 1x2 brick of the same color, or use one 2x3 brick and one 2x2 brick of the same color.



Place 7 studs on the ten-frame. Choose 3 studs of another color .



Place those 3 studs on top of the 7 studs that are on the ten-frame. Ask students what the 3 studs show. Students should understand that 3 is the subtrahend or the amount being subtracted in the problem. They may say 3 is the answer, but it is not. The answer to the problem is 4.



Have students count on from the 3 studs to the original 7 (“4, 5, 6, 7”). Ask them how many studs they counted on. Students should understand they have counted on 4 more studs, which is the *difference*.

Have students draw the model, explain the parts of the problem, and write the math sentence. Students should be able to explain that the start number is 7. Placing 3 studs from the subtrahend on top of the minuend’s 7 studs and counting up to 7 shows 4 studs, which is the difference or result unknown. $7 - 3 = 4$

Result Unknown Problem #2: $9 - 5 = \square$

Comparison method (using 1x10 strips):

Build three 1x10 strips to represent the three numbers in the problem (the *minuend*, *subtrahend*, and *difference*).

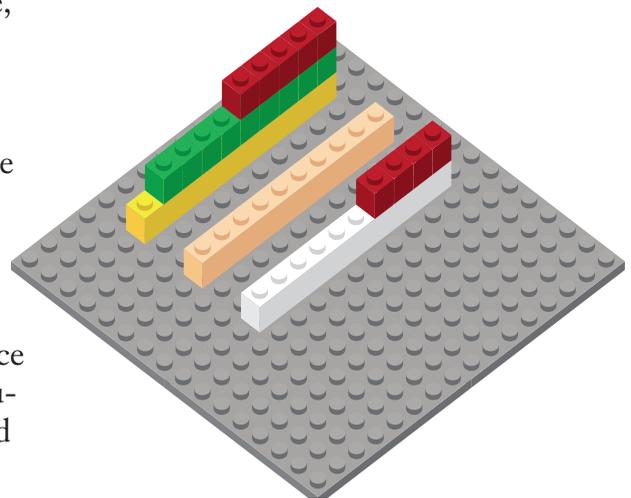
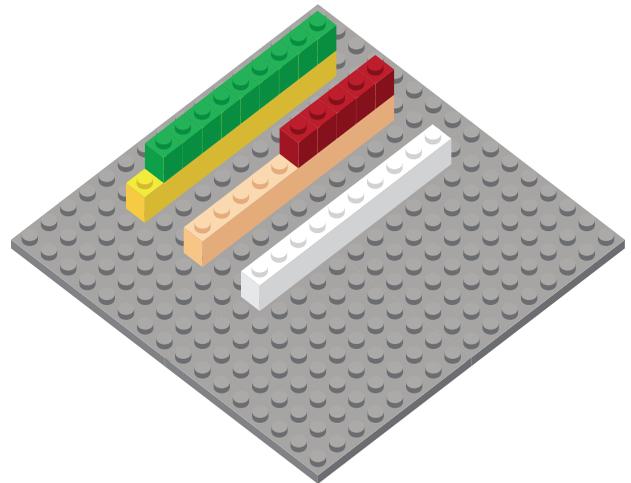
Place 9 studs on the left strip to represent the minuend in the starting place.

Place 5 studs on the center strip to represent the subtrahend or the amount being subtracted.

Do not place any studs on the right strip to represent the difference or result unknown.

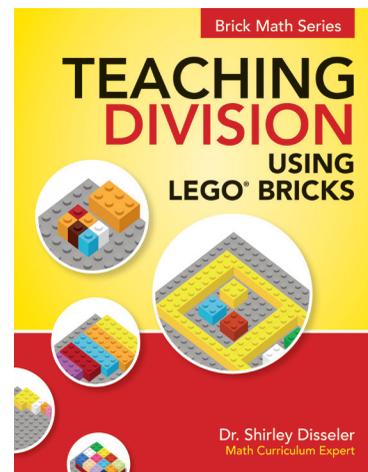
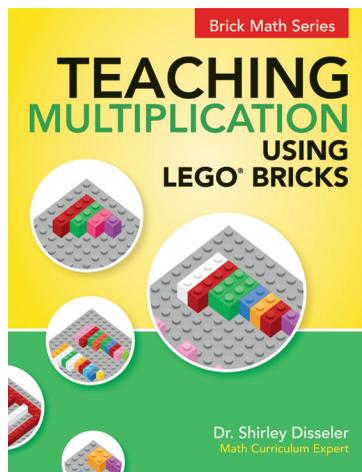
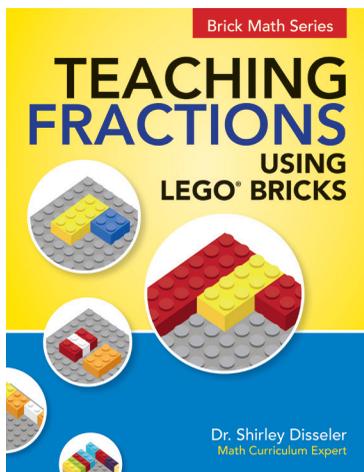
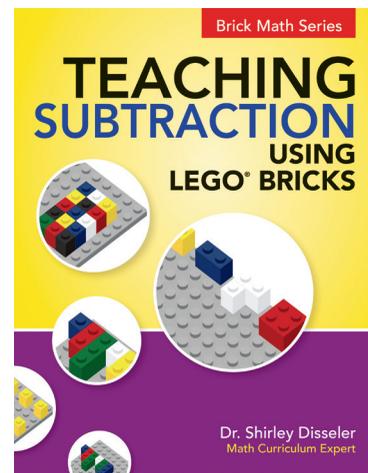
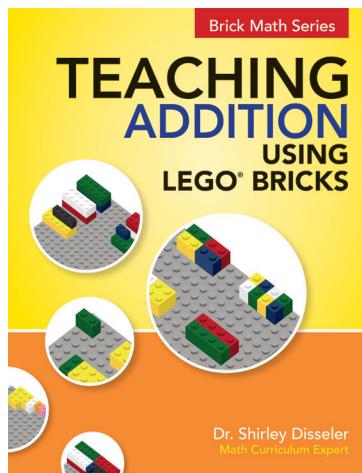
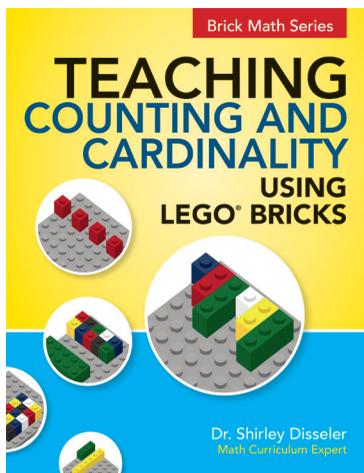
Ask students how to determine the missing number using subtraction strategies. Students could use strategies like counting up, one-to-one correspondence, part-part-whole, or matching to find the solution.

Have students put a finger on the center 1x10 strip that shows the number being taken away or subtracted. Use the vocabulary (*subtrahend*). Count the number of studs on that strip using one-to-one correspondence. Explain that this number (5) is in the change location and is the number that the minuend has to be reduced by to determine the difference or result unknown. Have students place these 5 studs on top of the 9 studs that represent the minuend on the left strip to find the difference. Students should compare to find 4 uncovered studs.



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Individual student books that follow the teaching curriculum, complete with additional activities for practice and assessments.

