Brick Math
Lesson of the Month

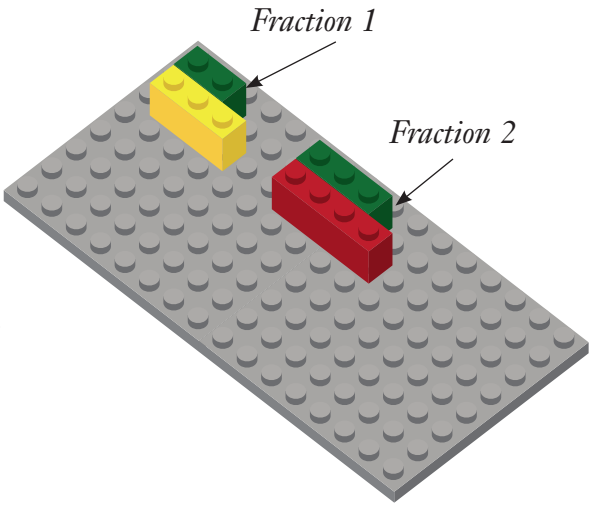
November 2019

from:
Basic Fractions Using LEGO® Bricks
(2nd edition, published Nov. 2019)

Ordering Fractions with Unlike Denominators by Size

Teacher lesson guide
plus Student workbook pages

Teacher's lesson guide:



Problem #1: Ordering fractions by size

1. Explain to students that this lesson will use a format called the "fraction train" to find the Least Common Denominator of two or three fractions.

Have students build models of $^2/_3$ and $^3/_4$. Have students draw their models and label $^2/_3$ as Fraction 1 and $^3/_4$ as Fraction 2.

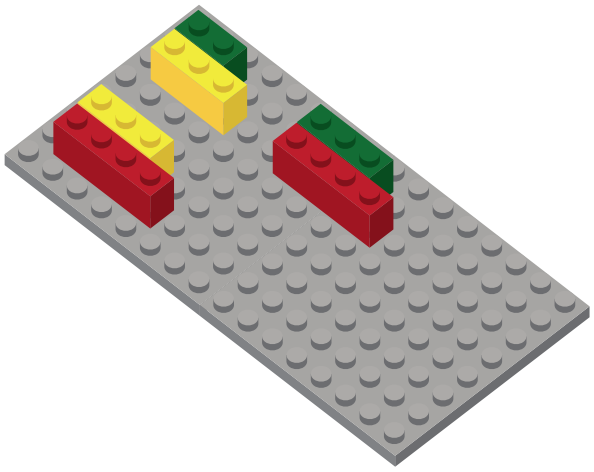
2. Discuss with students the value of the numerators and the denominators of these two fractions. Ask: Are the

wholes the same size in these fractions? Which one is larger? Can you prove your answer?

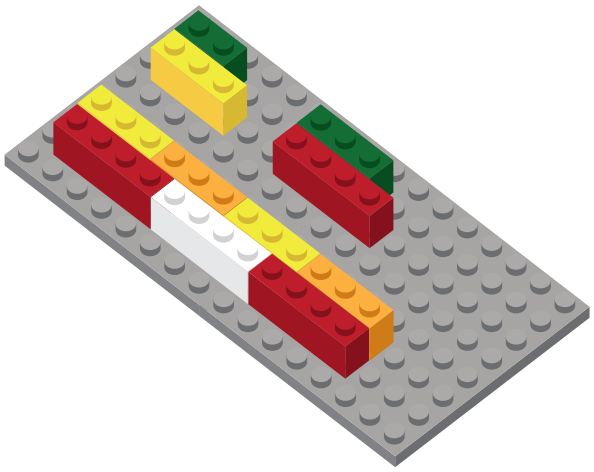
Explain to students that in this lesson they will learn how to use a common denominator to compare and order fractions.

3. Lead students to make a "fraction train" to find the LCD (Least Common Denominator) with these steps:

a. Place another 1x3 brick on the baseplate showing the denominator of Fraction 1 ($^2/_3$).
b. Place another 1x4 brick showing the denominator of Fraction 2 ($^3/_4$) directly below the brick just placed, as illustrated.
c. Explain to students that they will be creating a "fraction train" by comparing these two wholes and building out a train of bricks that makes a rectangle.

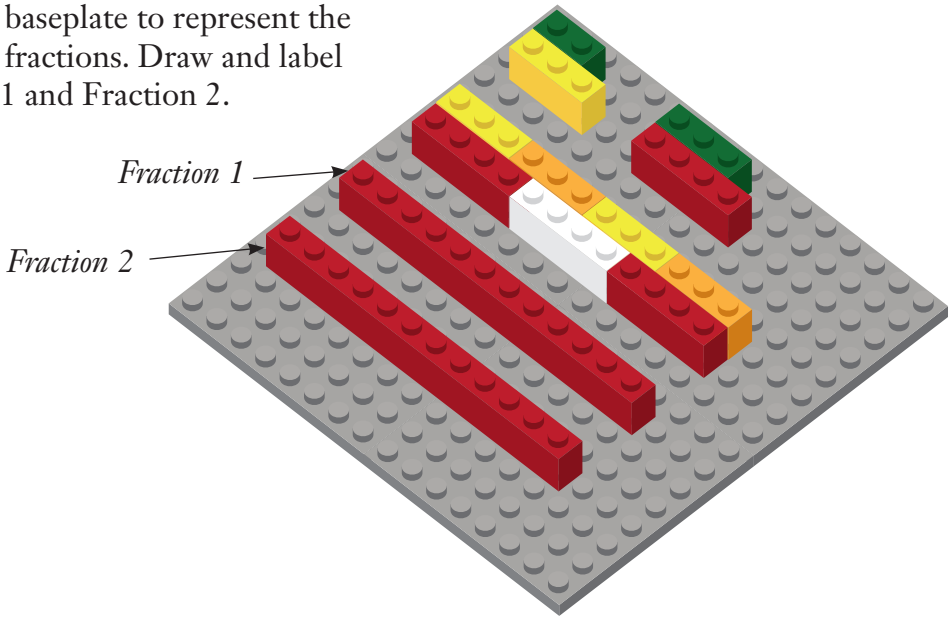


Add enough 1x3 bricks to the top row and 1x4 bricks to the bottom row until both rows are the same length and the bricks form a rectangle. The rectangle will show the LCD, or the smallest number that both wholes can divide into evenly. Have students draw their models of the fraction train.

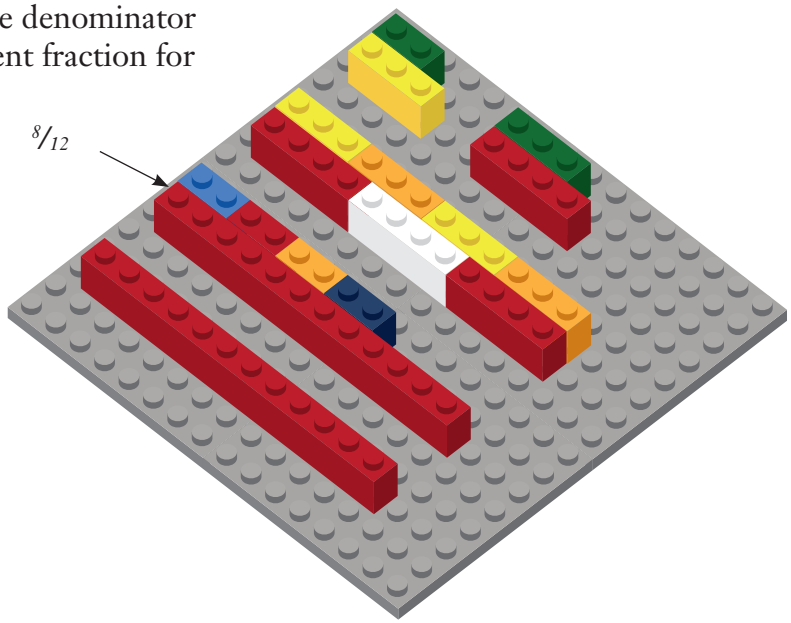


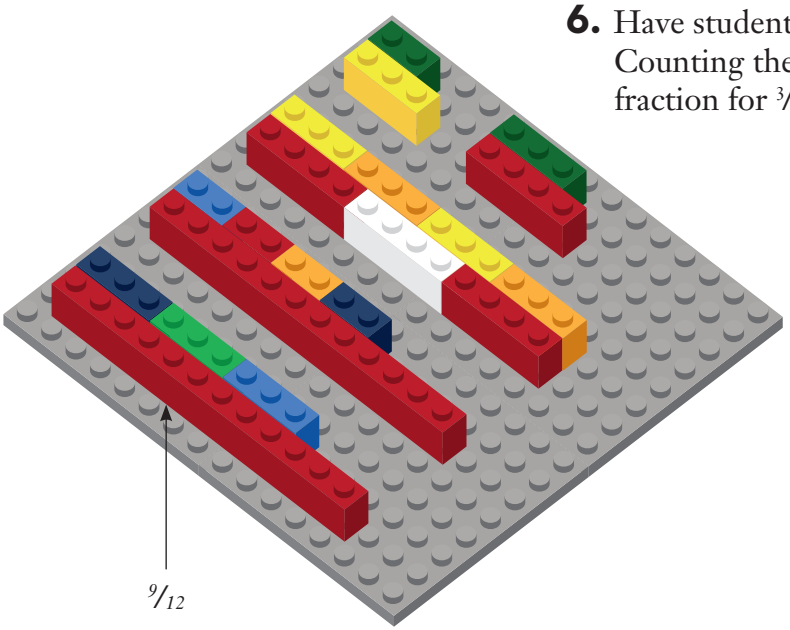
d. Ask students how many bricks are in the top row, which come from the denominator of Fraction 1 (*answer*: 4 bricks).
e. Ask students how many bricks are in the bottom row, which come from the denominator of Fraction 2 (*answer:* 3 bricks).
f. Ask students to count the number of studs in the length of the fraction train (*answer:* 12 studs long). Discuss the fact that 12 is the Least Common Denominator of 3 and 4. This makes 12 the equivalent whole for both fractions $^2/_3$ and $^3/_4$.

4. Place two 1x12 bricks on the baseplate to represent the equivalent wholes of the two fractions. Draw and label each 1x12 brick for Fraction 1 and Fraction 2.



5. Remind students that there are 4 bricks in the top row of the fraction train. Explain that this shows the number of bricks from the numerator of Fraction 1 that need to be in the model of the equivalent fraction. Place four 1x2 bricks above the 1x12 brick for Fraction 1. Count the studs in the numerator (*answer:* 8) and the denominator (*answer:* 12). This shows that the equivalent fraction for $^{2}/_{3}$ is $^{8}/_{12}$.





6. Have students repeat this process for Fraction 2. Counting the studs, the numerator is 9. The equivalent fraction for $^3/_4$ is $^9/_{12}$.

7. Have students look at the numerators of the two fractions and count the studs. Because the denominators are now the same, the fraction with the most studs in the numerator is the largest. Have students draw their models and write a math sentence using the correct syntax (answer: $^2/_3 < {}^3/_4$ because $^8/_{12} < {}^9/_{12}$).

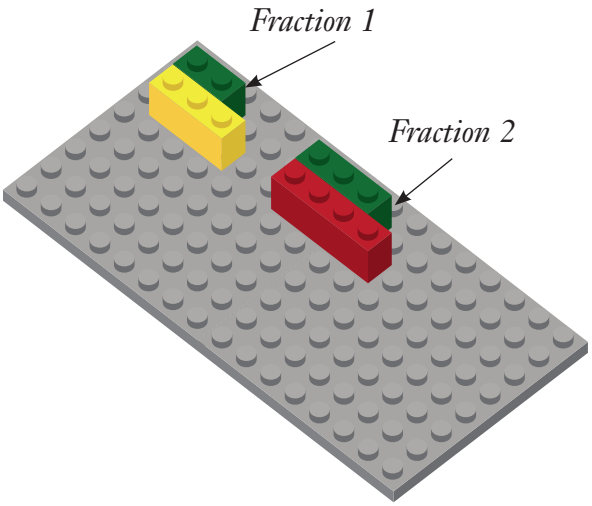
Brick Math Lesson of the Month from: Basic Fractions Using LEGO® Bricks (2nd Edition)

Ordering Fractions with Unlike Denominators by Size

Student workbook pages:

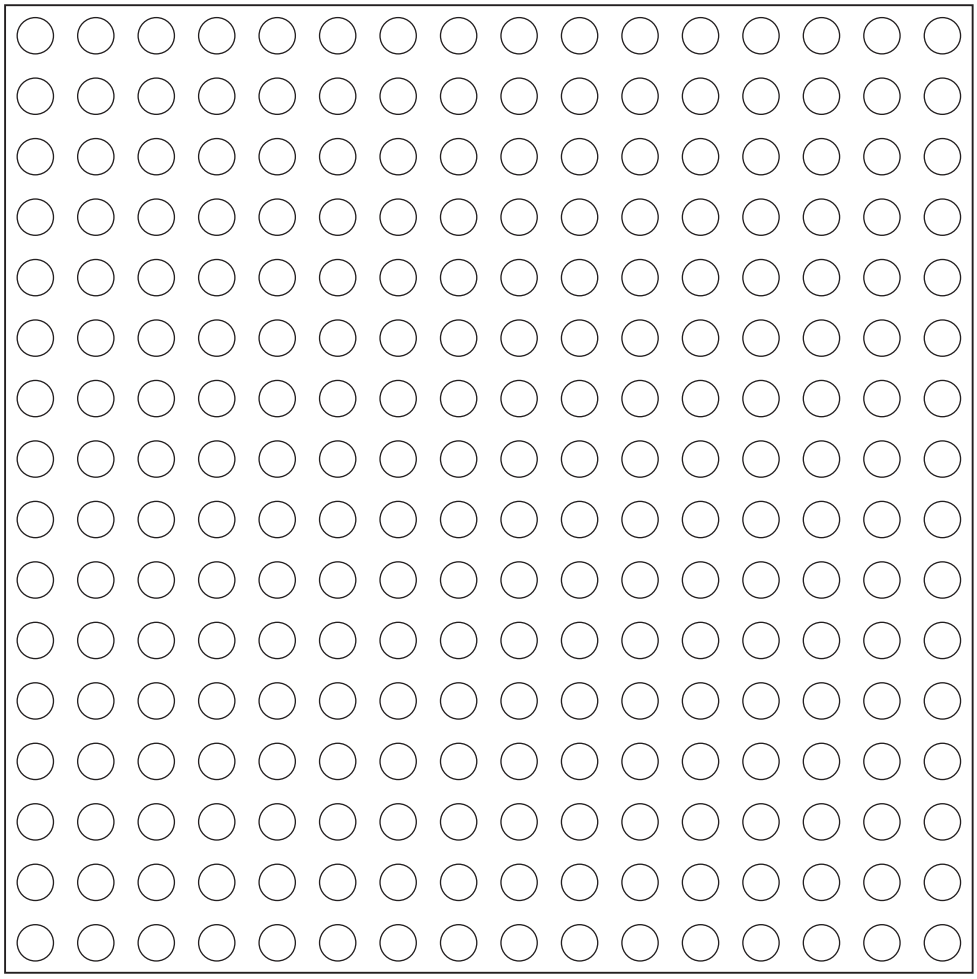
This chapter will use a format called the "fraction train" to find the Least Common Denominator of two or three fractions. You will learn how to use a common denominator to compare and order fractions.

Problem #1: Ordering fractions by size



1. Build models of $^2/_3$ and $^3/_4$ as illustrated.

Draw your models. Label $^2/_3$ as Fraction 1 and $^3/_4$ as Fraction 2.



2. Are the wholes the same size in these fractions? _____

Which whole is larger? _____

Explain your answer.

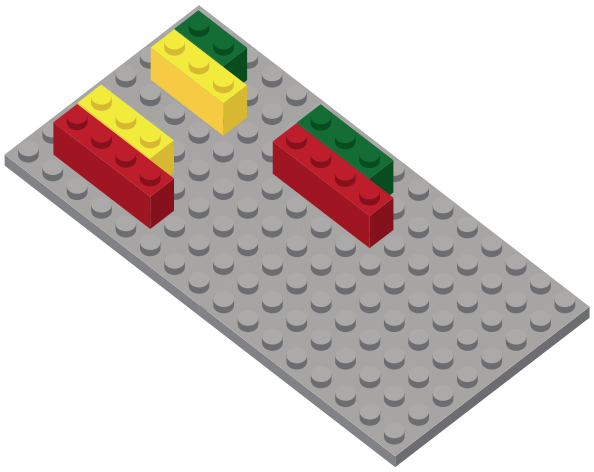
_____

_____

_____

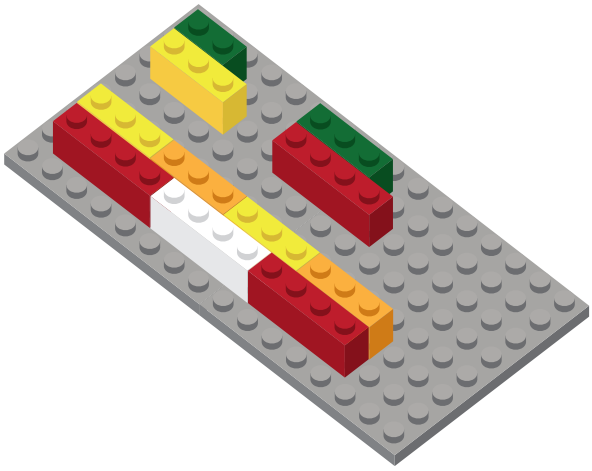
3. Make a "fraction train" to find the LCD (Least Common Denominator) with these steps:

a. Place another 1x3 brick showing the denominator of Fraction 1 ($^2/_3$) below Fraction 1 on the baseplate, as illustrated.
b. Place another 1x4 brick showing the denominator of Fraction 2 ($^3/_4$) directly below the brick just placed, as illustrated. You will be creating a "fraction train" by comparing these two wholes and building out a train of bricks that makes a rectangle.



c. Add enough 1x3 bricks to the top row and 1x4 bricks to the bottom row until both rows are the same length and the bricks form a rectangle. The rectangle will show the LCD, or the smallest number that both wholes can divide into evenly. Count the number of studs in the train's length to find the LCD. How many studs are there? _____

Draw your models of the fraction train on the baseplate diagram on page 50.

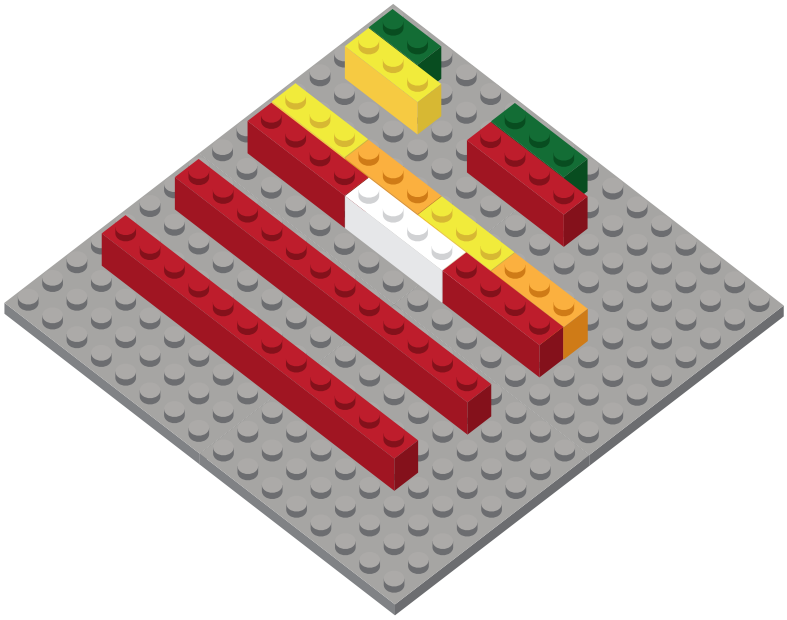


d. How many bricks are in the top row of the fraction train? _____ (this is from the denominator of Fraction 1)
e. How many bricks are in the bottom row of the train? _____(this is from the denominator of Fraction 2)
f. The total of studs is the LCD of the number of bricks in the top row and the number of bricks in the bottom row. Complete this statement:

   The Least Common Denominator of _____ and _____ is _____, and _____ is the equivalent whole for both $^3/_4$ and $^2/_3$.

   (Look at the illustrations for help.)

4. Place two 1x12 bricks on the baseplate to represent the equivalent wholes of the two fractions. On the baseplate diagram on page 50, draw and label each 1x12 brick for Fraction 1 and Fraction 2.



5. How many bricks are in the top row of the fraction train (from Fraction 1)? _____

This shows how many bricks from the numerator of Fraction 1 need to be in the equivalent whole.

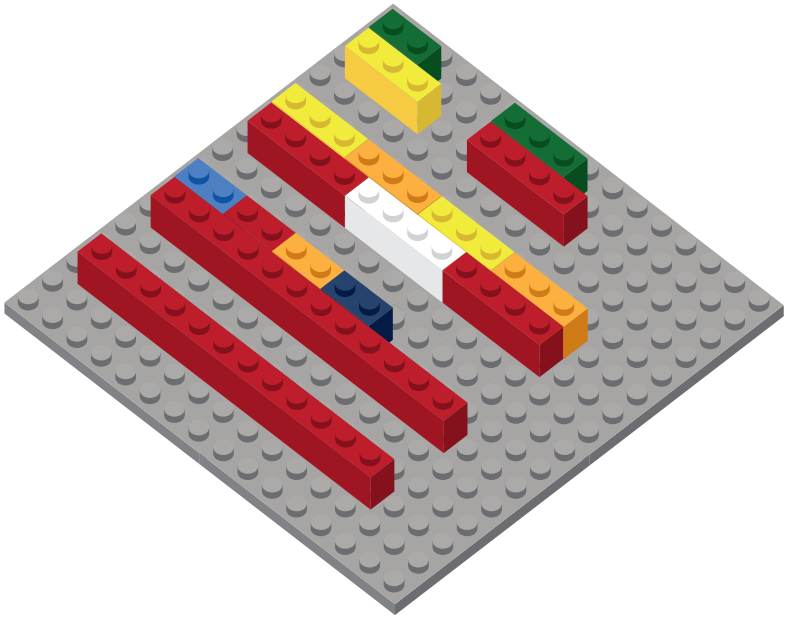
Since the numerator of Fraction 1 is shown with a 1x2 brick, you will need the same number of 1x2 bricks in the equivalent Fraction 1 as are in the top row of the train.

How many 1x2 bricks do you need? _____

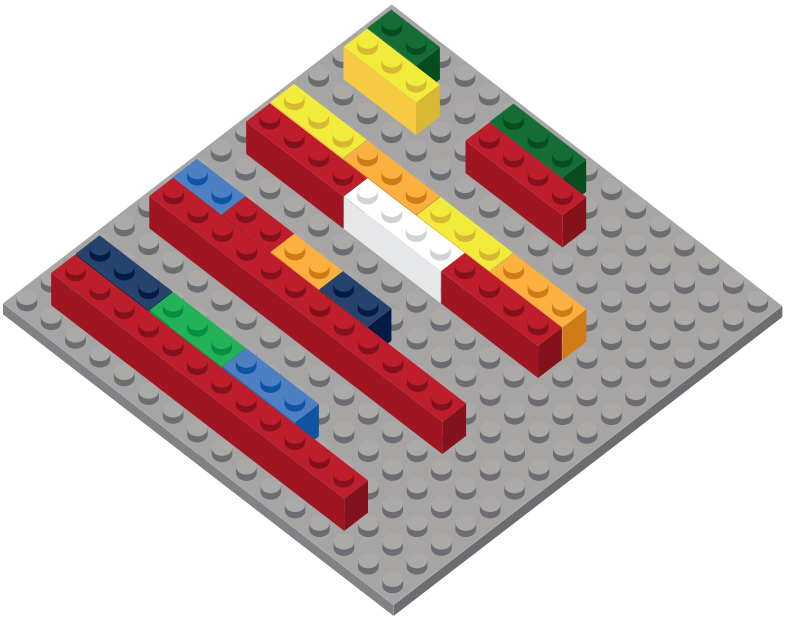
How many studs are in the numerator of the equivalent Fraction1? _____

How many studs are in the denominator? _____

This shows that the equivalent fraction for $^2/_3$ is _____.



6. Repeat this process for Fraction 2. Count the studs to find the numerator and the denominator. The equivalent fraction for $^3/_4$ is _____.



7. Look at the numerators of the two fractions and count the studs. Because the denominators are now the same, the fraction with the most studs in the numerator is the largest. Draw your models on page 50 and write a math sentence here using <, >, or =.

_____