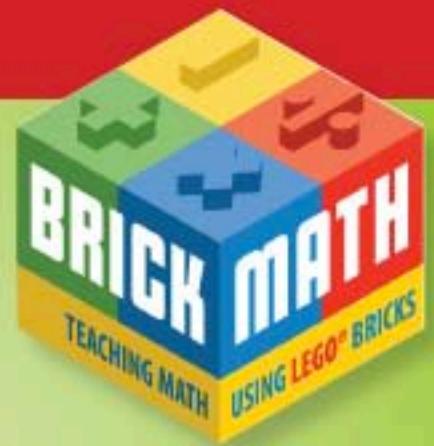
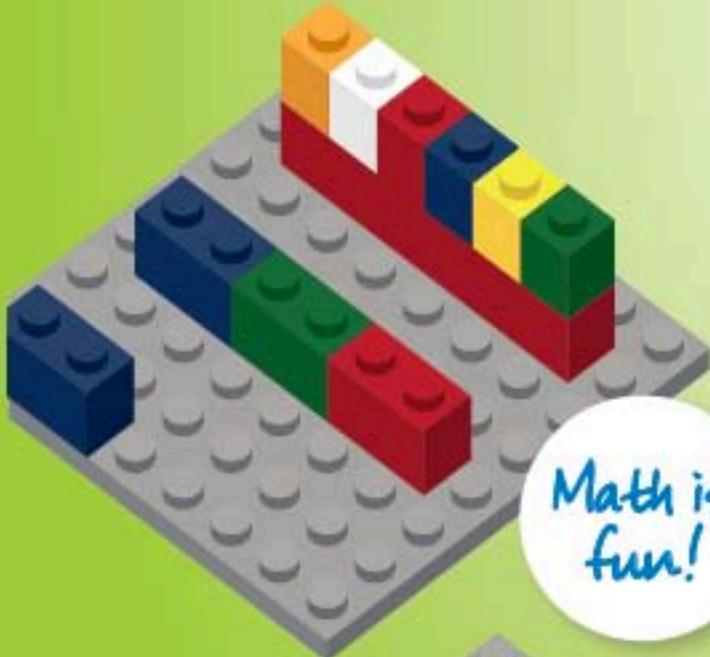


STUDENT EDITION

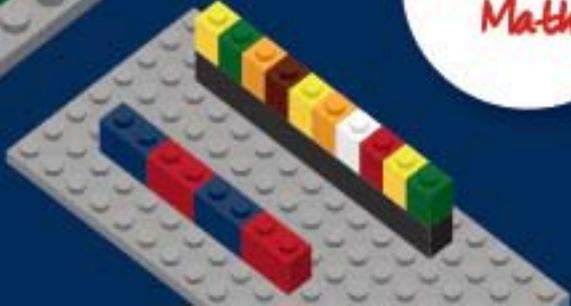
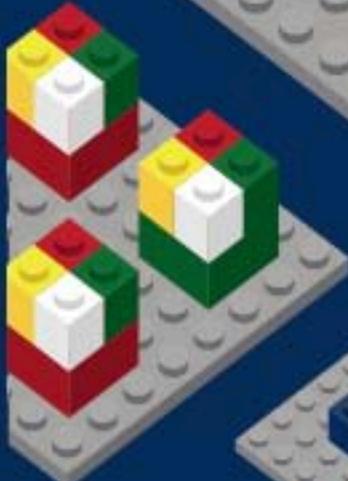


FRACTION DIVISION

USING LEGO® BRICKS



Math is fun!



Hands-on Math

Dr. Shirley Disseler

FRACTION DIVISION USING LEGO BRICKS
DR. SHIRLEY DISSELER



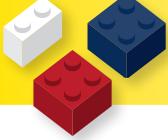
UNDERSTANDING FRACTION DIVISION

Part 1

1. When you multiply whole numbers, what happens to the solution?

2. When you divide two whole numbers, what happens to the solution?

3. What do you think will happen to the solution if you multiply two fractions or divide two fractions?



4. What does this math sentence mean? $16 \div 8 = 2$

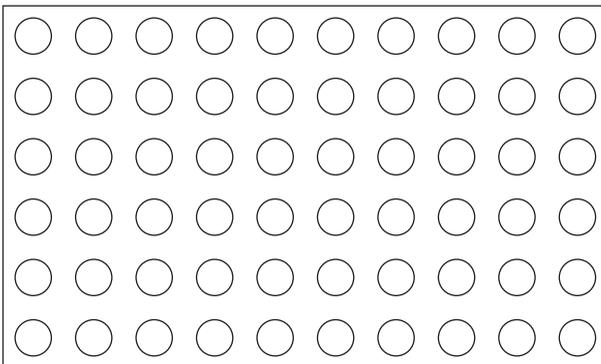
Problem #1: $\frac{1}{2} \div \frac{1}{8}$

1. Envision a flatbread pizza cut into 8 pieces.

Place a 1x8 brick on a baseplate to represent the pizza.

How many pieces of pizza are there? _____ Place eight 1x1 bricks on the top of the 1x8 brick to represent the 8 pieces of pizza.

2. Since the problem calls for only half the pizza, make a model that shows $\frac{1}{2}$ of the pizza. Since 4 is $\frac{1}{2}$ of 8, use a 1x4 brick to show the half-pizza. Move 4 of the 1x1 bricks that are on the 1x8 brick over to the top of the 1x4 brick to show the pieces in that half. Build this model and draw it.



3. How many pieces are in the half-pizza? _____ This is the solution to $\frac{1}{2} \div \frac{1}{8}$.

What is the solution? _____

(Be sure to use a “quantifier” or a word that tells you what the number means.)



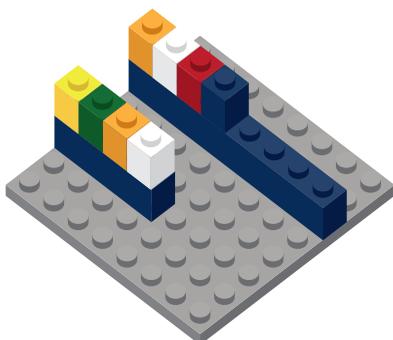
4. Refer to the whole number problem: $16 \div 8 = 2$. Use multiplication to see how that answer is correct by using the reverse: $2 \times 8 = 16$.

$16 \div 8$ is the same as $\frac{16}{8}$ when written as a fraction. This fraction means $\frac{16 \times 1}{1 \times 8}$

5. Using the commutative property for multiplication, the problem $\frac{1}{2} \div \frac{1}{8} = 4$ can be reversed to $4 \times \frac{1}{8} = \frac{1}{2}$. If the problem is written like a whole number multiplication problem using the reverse, the fraction is called the *reciprocal*. For example, the reciprocal of 2 is $\frac{1}{2}$ because $2 \times \frac{1}{2} = 1$ whole.

This math sentence can be expressed as: $4 \times \frac{1}{8} = \frac{4}{8} = \frac{1}{2}$

Looking at the model, 4 sets of $\frac{1}{8}$ (four 1x1 bricks) is the same as $\frac{1}{2}$ in the original model. The model shows 8 studs divided into two parts. Each part has 4 pieces.



6. Rewrite the division problem using the reciprocal of $\frac{1}{8}$ ($\frac{8}{1}$) to show the mathematical procedure for solving the problem.

Problem #2: $\frac{1}{2} \div \frac{1}{12}$

Step 1: Place a brick with 12 studs on a baseplate.

Step 2: Determine what brick is equivalent to $\frac{1}{2}$ of the 12 studs.

Step 3: Think about the problem as a real-world scenario: If the 12-stud brick represents a carton of eggs, how many eggs are in the carton?

Place twelve 1x1 bricks on top of the 12 studs to show each egg. This shows that there are $\frac{12}{12}$ in the whole.

Step 4: Move $\frac{1}{2}$ of the 1x1 bricks to the model to show $\frac{1}{2}$ of the carton of eggs.