

DELTA MATH SCIENCE PARTNERSHIP INITIATIVE

M<sup>3</sup> Summer Institutes

(Math, Middle School, MS Common Core)

**Multiplying Fractions**

Common Core State Standards:

6.NS.1

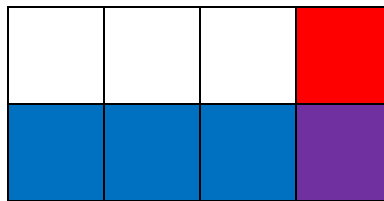
Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for  $(2/3) \div (3/4)$  and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that  $(2/3) \div (3/4) = 8/9$  because  $3/4$  of  $8/9$  is  $2/3$ . (In general,  $(a/b) \div (c/d) = ad/bc$ .) How much chocolate will each person get if 3 people share  $1/2$  lb of chocolate equally? How many  $3/4$ -cup servings are in  $2/3$  of a cup of yogurt? How wide is a rectangular strip of land with length  $3/4$  mi and area  $1/2$  square mi?*

**Hook Problem:** Jeya bought a Kit Kat with her to school. She decides to eat  $\frac{1}{4}$  of it. Her best friend Bailey asks for a piece so Jeya gives her  $\frac{1}{2}$  of the piece that she intends to eat. How much of the Kit Kat did Jeya give Bailey?

**Final Answer:**

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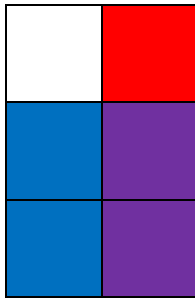
**Teacher Model:**  $\frac{1}{2}$  of  $\frac{1}{4}$  or  $\frac{1}{2} \times \frac{1}{4}$  using an area model.



**5 groups of 4 people:** Engage and explore solutions using an area model (Kit Kat representation) that represents  $\frac{1}{2} \times \frac{1}{4}$ .

1. Share results and journal your thought process to model multiplication with fractions using an area model.
2. Kierra and Danielle climb a rock wall. Kierra climbs  $\frac{1}{2}$  of a rock wall's height. Danielle climbs  $\frac{2}{3}$  of Kierra's distance. What fraction of the total height does Kierra climb? Use a model.

**Teacher Model:**  $\frac{2}{3}$  of  $\frac{1}{2}$  or  $\frac{2}{3} \times \frac{1}{2}$  using an area model.



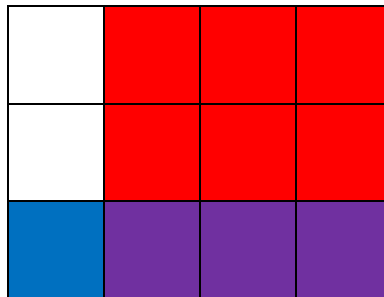
**Guiding Questions/Statements:**

3. What represented  $\frac{1}{4}$  of Jeya's Kit Kat bar?
4. How can we represent the distance that Kierra climbed using the copy paper you were given and a colored pencil?

Solve the following problems:

5. You have  $\frac{3}{4}$  of a pizza left. If you give  $\frac{1}{3}$  of the leftover pizza to your brother, how much of a whole pizza will your brother get?

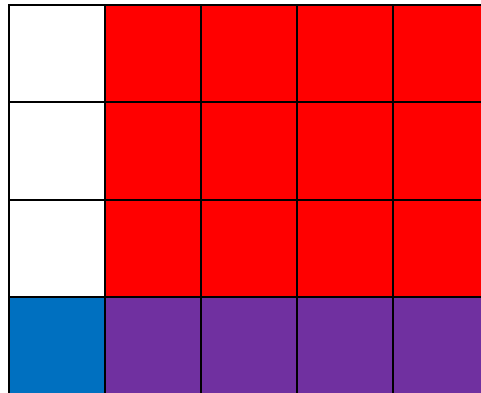
**Teacher Model:**  $\frac{1}{3}$  of  $\frac{3}{4}$  or  $\frac{1}{3} \times \frac{3}{4}$  using an area model.



6. The Cleveland Park Commission offers a rock-climbing class for children ages 8-17. In one session,  $\frac{4}{5}$  of the students are 12 years old. Of the 12-year-old students,  $\frac{1}{4}$  are from Merigold. What fraction of the students are 12 years old and from Merigold?

7. Share solutions and discuss representations of answers.

**Teacher Model:**  $\frac{1}{4}$  of  $\frac{4}{5}$  or  $\frac{1}{4} \times \frac{4}{5}$  using an area model.



**Look at the four examples and write them down. Guiding statement/ question:**

Look at the two factors and the product in each problem. Compare the numerator and denominator of the product with the numerators and denominators of the factors. What relationship do you see?

$$\frac{\text{numerator} \times \text{numerator}}{\text{denominator} \times \text{denominator}} = \frac{\text{numerator}}{\text{denominator}}$$

↑
↑
↑  
factor
factor
product

Consider the following problem:

8. A student skis  $3\frac{1}{2}$  miles in an hour. An instructor can ski  $1\frac{1}{3}$  times as far in an hour. How far does the instructor ski in an hour?

**Guiding questions:** How can we solve this problem based on what we know about multiplying fractions so far?

9. A painting is  $1\frac{3}{4}$  feet by  $1\frac{5}{8}$  feet. What will a copy of the painting be if its length and width are  $1\frac{1}{3}$  the size of the original?

10. Share results.

**Guiding questions:** How is the distributive property shown in the previous 2 problems? Discuss.

**Reflection:** Why would I want to start out with modeling fraction multiplication?

**Extension Work/Homework:** Daily Warm-Up

11. Heather is helping out at Sunshine Preschool. At noon, she notices that  $\frac{1}{2}$  of the children were missing. When she called for them,  $\frac{1}{2}$  of the missing children returned to the room. But as soon as Heather turned her back,  $\frac{1}{2}$  of the children in the room left again. Of those who remained in the room,  $\frac{1}{2}$  played with blocks,  $\frac{1}{3}$  played with the dress-up clothes, and the rest looked at books. If just one child is looking at a book, how many children were in the room before noon?