LessonTitle: Multiplying Fractions with Area Models — Pre 2.2

Utah State Core Pre-Algebra Content Standards 1, 3.1 Process Standards 1-5

Summary

In this activity, students learn to model multiplication using area models. Then they use this visual model to develop understanding for multiplying fractions. During this activity they discover the rule for multiplying fractions.

Enduring Understanding

Number-line models allow us to visualize and demonstrate the operations (+, -, x, ÷) with fractions.

Essential Questions

- Why do we multiply the numerator and the denominator when we multiply fractions?

Skill Focus

- Problem solving with fractions
- Multiplying with fractions

Vocabulary Focus

Materials

Launch ideas:

"We launched with a fundraiser idea. Most students have been involved in some kind of fundraiser. We told them that the kids earned 1/4 of the total as prize money, but they had to split it up with the other kids on the team (5 kids total). So, we were multiplying 1/5 x 1/5. We drew the square on the board and worked the problem."

Explore

"We were looking for students who were dividing the whole evenly, drawing straight lines, simplifying when needed, and drawing tick marks before drawing the lines. We would be walking around and asking: What part represents this fraction? What does your answer mean?"

Summarize

"They would do the first page (4 boxes) and then we would get back together and have them done on the board/overhead. This would ensure that all students are on the right page and knowing how to do the rest of the assignment. We didn't want everyone to do the whole thing wrong. This was a good time to stop them before they went any further. We could also talk about the patterns that they saw, since these questions were still on the first page."

Apply

Assess

Information:

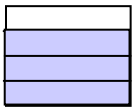
"We had a good discussion about whether this lesson was valuable or not. It seems that if you did this lesson before you taught multiplying fractions, it was valuable. If you did it after, then it was boring and a repeat. The launch really helped the students to get involved."

Multiplying Fractions with Area Models

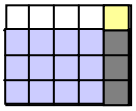
When you think of 2 x 3, think of it as 2 sets **of** 3. We can model this using area. 

When you model multiplying with fractions, think of it the same way. For example, 3/4 x 1/5 can be though of as 3/4 **of** 1/5. This is how we model it.

- Model the first fraction (3/4) horizontally. Color in using one color.



- Model the second fraction (1/5)vertically. Color in using another color.



- The intersection of the two colors shows you 3/4 of 1/5 or 1/5 of 3/4.

  What will this area be called?_____

  Why will it be called this?_____

2) Draw the multiplication. Show how to use the numbers to find the answer below the drawing.

2/3 of 2/3 or 2/3 * 2/3 = _____

1/3 of 3/4 or 1/3 * 3/4 = _____

1/2 of 3/8 or 1/2 * 3/8 = _____

3/5 of 2/3 or 3/5 * 2/3

3) These are multiplication problems. Why is your answer smaller than either of the two numbers you have multiplied together?

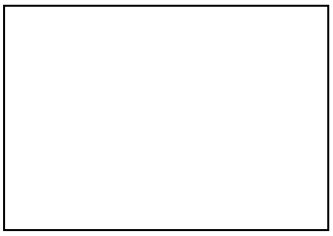
_____

4) Write your rule for how to multiply fractions.

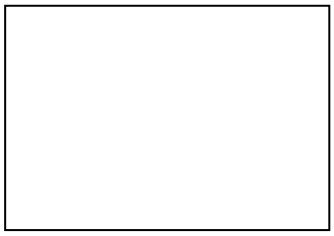
_____

More Practice:

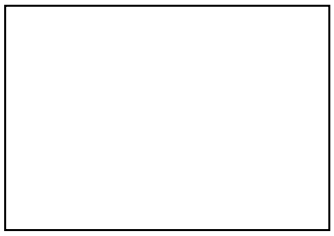
$\frac{3}{8}$ *of* $\frac{2}{7}$ =



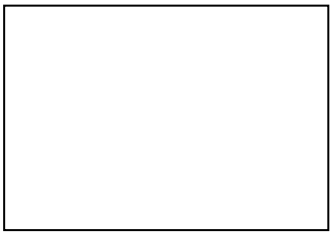
$\frac{3}{4}$ *of* $\frac{7}{12}$ =



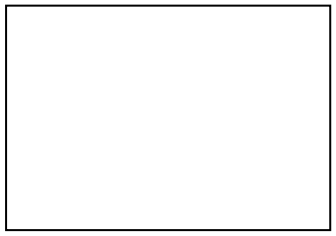
$\frac{4}{7}$ *of* $\frac{7}{12}$ =



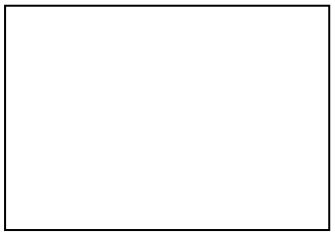
$\frac{4}{9} \cdot \frac{5}{8}$ =



$\frac{3}{10} \cdot \frac{5}{8}$ =



$\frac{3}{8} \cdot \frac{1}{2}$ =



$\frac{7}{8} \cdot \frac{2}{3}$ =

Extra For Experts! 2/7 * (2 and 3/5) = _____