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| **NC.5.NF.4****Multiplying Fractions with Color Tiles**  |
| **Domain** | **Numbers and Operations - Fractions** |
| **Cluster** | **Apply and extend previous understandings of multiplication and division to multiply and divide fractions** |
| **Standard(s)** | **NC.5.NF.4** Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction, including mixed numbers.* Use area and length models to multiply two fractions, with the denominators 2, 3, 4.
* Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and when multiplying a given number by a fraction less than 1 results in a product smaller than the given number.
* Solve one-step word problems involving multiplication of fractions using models to develop the algorithm.
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| **Materials** | Paper and pencil1 inch grid paper and color tiles |
| **Task** | **Part 1:**Have students cut a 4 x 4 inch grid and solve the problem below.Cover $\frac{3}{4}$ of the grid with one color of the tiles.Cover $\frac{1}{2}$ of the covered area with another color of the tiles.Write an equation to show how much of your model is covered by both colors oftiles*.***Part 2:**Have students cut a 6 x 6 inch grid and solve the problem below.Cover $\frac{2}{3}$ of the grid with one color of the tiles.Cover $\frac{1}{4}$ of the covered area with another color of the tiles.Write an equation to show how much of your model is covered by both colors of tiles.**Part 3:** What relationship do you notice between the numerators in your two factors and your product? What relationship do you notice between the denominators?  |

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| **Rubric** |
| **Level I****Not Yet** | 1. **Level II**
2. **Progressing**
 | **Level III****Meets Expectations** |
| * Student is not yet able to build the models described in this task.
 | Student correctly completes 2 or 3 of the bullets below:* Student is independently able to build the model described in Part 1.
* Student is independently able to build the model described in Part 2.
* Student is able to record the equations to represent Part 1 ($\frac{1}{2} x\frac{3}{4}=\frac{3}{8}$) and Part 2($\frac{1}{4}x\frac{2}{3}=\frac{2}{12}$).
* Student describes the relationship between the factors and the product.
 | Student correctly completes all of the bullets below:* Student is independently able to build the model described in Part 1.
* Student is independently able to build the model described in Part 2.
* Student is able to record the equations to represent Part 1 ($\frac{1}{2} x\frac{3}{4}=\frac{3}{8}$) and Part 2($\frac{1}{4}x\frac{2}{3}=\frac{2}{12}$).
* Student describes the relationship between the factors and the product.
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| **Standards for Mathematical Practice** |
| 1. **Makes sense and perseveres in solving problems.** |
| **2. Reasons abstractly and quantitatively.** |
| 3. Constructs viable arguments and critiques the reasoning of others. |
| **4. Models with mathematics.** |
| 5. **Uses appropriate tools strategically.** |
| 6. **Attends to precision.** |
| **7. Looks for and makes use of structure.** |
| 8. Looks for and expresses regularity in repeated reasoning. |

This task was adapted from *NYC Public Schools.*

**Multiplying Fractions with Color Tiles**

**Part 1:**

Have students cut a 4 x 4 inch grid and solve the problem below.

Cover $\frac{3}{4}$ of the grid with one color of the tiles.

Cover $\frac{1}{2}$ of the covered area with another color of the tiles.

Write an equation to show how much of your model is covered by both colors oftiles*.*

**Part 2:**

Have students cut a 6 x 6 inch grid and solve the problem below.

Cover $\frac{2}{3}$ of the grid with one color of the tiles.

Cover $\frac{1}{4}$ of the covered area with another color of the tiles.

Write an equation to show how much of your model is covered by both colors of tiles.

**Part 3:**

What relationship do you notice between the numerators in your two factors and your product? What relationship do you notice between the denominators?