**FRACTIONS**

Subject: *Multiply with Fractions* Grade: *5*

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| Common Core State Standards |
| **5.NF.5a:** Interpret multiplication as scaling (resizing), by comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication**5.NF.6:** Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.  |
| Objectives |
| Students will learn to multiply fractions and mixed numbers, and interpret the process as a method of rescaling a number by a certain factor.  |
| Launch Questions |
| **Q.** If you multiply two proper fractions, will the result be greater than 1?**Q.** If you multiply an improper fraction and a proper fraction, will the result be greater than the value of the improper fraction?**Q.** Under what circumstance will the result of multiplying two fractions be greater either one of the fractions? |
| Definition/Properties To Know |
| **Scaling/Resizing:** Linear transformation that either increases or decreases the size of an object by a factor  |

*Warm-Up Activity:* See “WU 6”

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| Lesson (Introduction to Problem) |
| Your friend John works at Central Park and he is responsible for creating new sections designed for recreational activities. This year, he will be creating a space specifically for a big musical festival and he needs your help determining the area of space needed for event. The space is in the form of a rectangle and each side, measured in miles, is of fractional size. The formula for calculating the area of a rectangle is: $length ⋅width$*.* **Q.** If the length is $\frac{4}{5}$miles and the width is $\frac{2}{3}$miles, then how big is the area? Justify your answer with a drawing.**Q.** If the length is $\frac{5}{6}$miles and the width is $\frac{4}{5}$miles, then how big is the area? Justify your answer with a drawing.* Students should draw a rectangle, divide it **vertically** into *y* sections according to the denominator of the **first** fraction and shade *x* sections according to the numerator.
* On the same rectangle, students should divide it **horizontally** into *b* sections according to the denominator of the **second** fraction and shade *a* sections according to the numerator.
* The rectangle should have $(y⋅b)$ squares. This visual exercise is a good way to visualize the multiplication process because it applies equivalence fractions.
* The answer is the number of “dark” squares divided by $(y⋅b)$; “dark” squares refers to those which have been shaded in twice (horizontally and vertically).
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| Materials (If Needed) |
| * Paper and Pencil
* Ruler (if necessary)
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*Main Project:* See “MP 6”

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| Closure/Expectations |
| Students should feel comfortable multiply any real number by the end of this lesson. At the same time, students should be able to model the multiplication process, especially the product of two fractions. Students should be well prepared because this topic will reappear again in “division of fractions”.  |