**FRACTIONS**

Subject: *Multiplying Fractions by Whole Numbers* Grade: *4*

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| Common Core State Standards |
| **4.NF.4b:** Understand a multiple of $\frac{a}{b}$ as a multiple of $\frac{1}{b}$*,* and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 x* $\frac{2}{5}$ *as 6 x* $\frac{1}{5}$*, recognizing this product as* $\frac{6}{5}$*. (In general, n x* $\frac{a}{b}$ *=*$\frac{n x a}{b}$*)* |
| Objectives |
| Students will learn to multiply a fraction by a whole number using the standard formula ($n x \frac{a}{b}=\frac{n x a}{b}$). They will also learn to decompose a fraction into the product of a unit fraction and a whole number.  |
| Launch Questions |
| **Q.** What does it mean to divide an object into n-parts of equal size?**Q.** If I divide an object into n-parts, what do I call one part? |
| Definition/Properties To Know |
| **Multiple:** The result of multiplying any number by an integer. *(Ex.* $\frac{1}{3}⋅3=\frac{3}{3}$)**Whole Numbers:** A set of nonnegative integers |

*Warm-Up Activity:* See “WU 8”

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| Lesson (Introduction to Problem) |
| Your friend Kim is making some authentic Vietnamese Pho and needs your help catering to her quests. Right now Kim has 3 gallons of beef broth in her large cooking pot and she hopes it will be enough to serve her guest. Note: Each bowl of Pho has$\frac{2}{9}$gallons of beef broth. **Q.** If Kim serves 4 bowls of Pho, how many gallons of beef broth will she need? How much will be left in the cooking pot? Include a drawing to support your claims. **Q.** If Kim serves 12 bowls of Pho, how many gallons of beef broth will she need? How much will be left in the cooking pot? Include a drawing to support your claims. **Q.** Will Kim have enough to serve 18 bowls of Pho? Justify your answer. * Students should model the fraction $\frac{2}{9}$with a Fraction Circle (or other shape) to indicate the quantity of broth in bowl of Pho. Then, students should think about how they can express 3 gallons as a fraction. This would require them to convert the whole number into an improper fraction with a denominator of 9; there should be 3 shapes divided into 9 pieces.
* For the first two questions, students will shade the regions representing the amount of gallons needed and write the fraction it represents. The unshaded region will represent the amount left in the cooking pot.
* For the last question, students can either convert 18 into an improper fraction, with denominator 9, and determine whether the value is greater than or less than 3. The other approach would be to multiply 18 by$\frac{2}{9}$and determine whether the resulting fraction is greater than or less than fractional representation of 3 (found in previous steps).
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| Materials (If Needed) |
| * Paper and Pencil
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*Main Project:* See “MP 8”

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| Closure/Expectations |
| Students should be able to decompose a given fraction into the product of its numerator and its unit fraction form, and reverse process (compose). When multiplying a fraction by a whole number, students should know that only the numerator is multiplied.  |