**FRACTIONS**

Subject: *Subtract Fractions with Unlike Denominators* Grade: *5*

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| Common Core State Standards |
| **5.NF.1:** Add and subtract fraction with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example,* $\frac{2}{3}+\frac{5}{4}=\frac{8}{12}+\frac{15}{12}=\frac{23}{12}.$ *(In general,* $\frac{a}{b}+\frac{c}{d}=\frac{(ad+bc)}{bd}$ *.)***5.NF.2:** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result* $\frac{2}{5}+\frac{1}{2}=\frac{3}{7}$*, by observing that* $\frac{3}{7}<\frac{1}{2}$*.*  |
| Objectives |
| Students will learn to subtract fractions with unlike denominators by applying prior knowledge of Least Common Multiple. Students will also learn to solve word problems with help from visual aid and/or equations.  |
| Launch Questions |
| **Q.** When do you subtract numerators? When do you subtract denominators?**Q.** How can you apply addition into solving subtraction problems? |
| Definition/Properties To Know |
| **Least Common Multiple (LCM):** The LCM for integers *x* and *y* is the smallest number that is a common multiple of both *x* and *y.*  **Equivalent Fractions:** Suppose $\frac{1}{k}$ and$\frac{n}{m}$are two fractions with *k,m*$\ne $0. These fractions are equivalent provided they both represent the same number and are of the same size;$\frac{1}{k}=\frac{n}{m}$. (Alternate Definition): Provided that *r*$\ne $0, the fraction $\frac{n x r}{m x r}$ is equivalent to$\frac{n}{m}$.**Missing Addend Method:** Suppose you were given the equation 5 - *x* = 3, and you were tasked to find the value of *x*. The Missing Addend Method says that you can change this subtraction problem into an addition problem since you are looking for the value of x (the addend) needed such that, when added to 3, the result is 5; 3 + x = 5 .  |

*Warm-Up Activity:* See “WU 2”

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| Lesson (Introduction to Problem) |
| It’s rush hour and your mom has a doctor’s appointment in an hour. You act as her navigator, meaning you tell her where to go and how far she is from her destination. The doctor’s office is 20 miles from where you guys are currently located. The table below shows much far you guys have traveled, in miles, every 10 minutes. Note: the first 10 minutes is denoted as “t1”, and every other ten minutes is labeled according to its ordinal number.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| t1 | t2 | t3 | t4 | t5 |
| $$\frac{10}{5}$$ | $$\frac{11}{3}$$ | $$\frac{38}{6}$$ | $$\frac{21}{5}$$ | $$\frac{28}{10}$$ |

**Q.** How far from the office are you guys after the first 10 minutes? **Q.** How far from the office are you guys after 30 minutes? Express answer as a mixed number**Q.** How many more miles does you mom need to drive in order to reach the office in time?* For the first question, students need to subtract $\frac{10}{5}$(or 2) miles from 20 miles. While it is not necessary for students to convert 20 into a fraction, the exercise serves a good practice for them.
* For the second question, students will need to add the first 3 distances in order to obtain the distance traveled after 30 minutes. This problem will serve as a review of addition with unlike denominators. Like the first question, students will have to subtract the resulting value from 20 (miles).
* For the third problem, students will need to add all the distances and, like the second question, subtract the resulting value from 20 miles in order to determine the remaining amount of miles needed to arrive to the office in time.
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| Materials (If Needed) |
| * Paper and Pencil
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*Main Project:* See “MP 2”

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| Closure/Expectations |
| Students should learn to solve (word) problems involving subtraction of two or more fractions with unlike denominators by using their prior knowledge of least common multiples and apply it to the denominators. By the end of this topic, students should be proficient in solving these questions and be able to convert subtraction problems into addition problems using the missing addend method.  |