**FRACTIONS**

Subject: *Add 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 add 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.** What role do equivalent fractions play in adding fraction with unlike denominators. **Q.** When do you add numerators? When do you add denominators? |
| 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$\frac{n}{m}$. |

*Warm-Up Activity:* See “WU 1”

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| Lesson (Introduction to Problem) |
| You and your friend Riley will be competing in an endurance match where the winner is determined by the person who ran the farthest within an hour. You are a slow runner but known to run for long periods of time. Riley, on the other hand, is a quick runner but known to stop after a short period of time. Every 10 minutes, yours distances traveled, in miles, are recorded below. The first 10 minutes is labeled “t1”, and the rest are labeled according to their ordinal number.

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| --- | --- | --- | --- | --- | --- | --- |
|  | t1 | t2 | t3 | t4 | t5 | t6 |
| You | $$\frac{9}{4}$$ | $$\frac{9}{5}$$ | $$\frac{9}{6}$$ | $$\frac{9}{7}$$ | $$\frac{9}{8}$$ | $$\frac{9}{9}$$ |
| Riley | $$\frac{5}{2}$$ | $$\frac{3}{2}$$ | $$\frac{10}{10}$$ | $$\frac{8}{9}$$ | $$\frac{7}{6}$$ | $$\frac{4}{5}$$ |

**Q.** How many miles did you run after 60 minutes? Express answer as a mixed number**Q.** How many miles did Riley run after 60 minutes? Express answer as a mixed number**Q.** Who run the match?* To solve the first two questions, students will have to apply their knowledge of equivalence fractions and least common multiple in order to obtain fractions of like denominators. This process will help students add fractions with ease. It is also recommended that students add fractions by pairs (t1+t2, t3+t4, t5+t6) so that the process they won’t have to find the LCM for all denominators.
* If students simplify fractions after adding them, then the final answer will be obtained faster. If they don't, then students will have to convert then add fractions whose denominator are really big. (*ex. LCM(20,6) = 60*).
* For the final question, students will compare the mixed numbers in order to determine who ran the farthest.
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| Materials (If Needed) |
| * Paper and Pencil
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*Main Project:* See “MP 1”

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| Closure/Expectations |
| Students should learn to solve (word) problems involving addition 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 addition problems with fractions.  |