Just In Time Quick Check

Standard of Learning (SOL) 4.5c

Strand: Computation and Estimation

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The student will solve single-step practical problems involving addition and subtraction with fraction and mixed numbers.

Grade Level Skills:

- Estimate the sum and difference of two fractions.
- Solve single-step practical problems that involve addition and subtraction with fractions (proper and improper) and/or mixed numbers, having like and unlike denominators limited to 2, 3, 4, 5, 6, 8, 10, and 12, and simplify the resulting fraction. (Subtraction with fractions will be limited to problems that do not require regrouping).

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - 4.5c – Adding and Subtracting Fractions: Understanding the Context (Word)/PDF Version
- VDOE Co-Teaching Mathematics Instruction Plans (MIPS)
  - 4.5c – Math Mat Problem Solving (Word)/PDF Version
- VDOE Algebra Readiness Remediation Plans
  - Adding and Subtraction Fractions – Using Pattern Blocks (Word)/PDF Version
- VDOE Word Wall Cards: Grade 4 (Word and PDF Version)
  - Fraction: Addition
  - Fraction: Subtraction
  - Least Common Multiple
  - Greatest Common Factor
- VDOE Rich Mathematical Tasks: Pouring Paints Task
  - 4.5c Pouring Paints Task Template (Word/PDF Version)
  - 4.5c Pouring Paints Student Version of Task (Word/PDF Version)
  - 4.5c Pouring Paints Anchor Papers (Word/PDF Version)
  - 4.5c Pouring Paints Anchor Papers Scoring Rationales (Word/PDF Version)

Supporting and Prerequisite SOL: 4.5a, 4.5b, 4.3d, 4.2b, 4.2c, 3.2a, 3.2b, 3.5, 2.4a, 2.4b

SOL 4.5c - Just in Time Quick Check

1) A store had $5\frac{7}{12}$ yards of fabric. If Tawana purchased $3\frac{5}{12}$ yards of this fabric to make a curtain, how much fabric would the store have left to sell? Write the fraction in simplest form.

2) Lisa was tracking the number of miles she biked for two weeks.

   a) Last week she biked $12\frac{9}{10}$ miles.
   b) This week she biked $10\frac{1}{12}$ miles.

   About how many more miles did she bike last week than this week? Explain your answer below.

3) Kamden walked the first $\frac{2}{5}$ of a mile and then he ran the rest of the distance. If Kamden completed $1\frac{3}{4}$ miles, how many miles did he run?

4) A family bought 2 pizzas, of equal size, for dinner. The family ate $\frac{7}{8}$ of one pizza and $\frac{5}{8}$ of the other pizza. How much pizza did the family eat for dinner? Write the answer in simplest form.

5) Ava and her mom baked a pan of brownies for dessert. The model below represents one whole pan of brownies.

Ava and her mom ate different amounts of the brownies. Together they ate $\frac{5}{12}$ of the brownies. Select the amount of brownies that Ava and her mom each could have eaten. There are two possible answers.

a) Ava ate $\frac{1}{6}$ of the brownies and her mom ate $\frac{4}{6}$ of the brownies.

b) Ava ate $\frac{1}{3}$ of the brownies and her mom ate $\frac{1}{12}$ of the brownies.

c) Ava ate $\frac{3}{8}$ of the brownies and her mom ate $\frac{2}{4}$ of the brownies.

d) Ava ate $\frac{1}{4}$ of the brownies and her mom ate $\frac{1}{6}$ of the brownies.

SOL 4.5c - Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1) A store had $5\frac{7}{12}$ yards of fabric. If Tawana purchased $3\frac{5}{12}$ yards of this fabric to make a curtain, how much fabric would the store have left to sell? Write the fraction in simplest form.

A common misconception when solving problems is not understanding the context of the problem in order to solve it. When solving problems, it is important for students to focus on thinking and reasoning rather than on key words. Students would benefit from exposure to a variety of different problem types and opportunities to create and solve their own practical problems. A chart with different addition and subtraction problem types is provided in the [Grade 3 Curriculum Framework]. Using models and visual representations are useful when understanding word problems.

When solving this particular problem, some students may add the two fractions together instead of finding the difference. Using models and/or pictorial representations will provide students additional support. A linear model such as fraction strips or number line could be used to model this problem.

When simplifying the resulting fraction, some students may have difficulty identifying a common factor. It is important for students to recognize that the fraction $2\frac{2}{12}$ is equivalent to $2\frac{1}{6}$. Students can build fractions using fraction strips or fraction bars, and then work to find fractions that are equivalent to the original fraction. For example, students may use sixths pieces to model one-sixth and then try several other fractional pieces until they discover that two-twelfths and one-sixth are equivalent. Once students have a conceptual understanding of equivalent fractions, teachers may begin applying the concept of common factors to simplifying fractions.

2) Lisa was tracking the number of miles she biked for two weeks.

   a) Last week Lisa biked $12\frac{9}{10}$ miles.
   b) This week Lisa biked $10\frac{1}{12}$ miles.

About how many more miles did Lisa bike last week than this week? Explain your answer below.

A common misconception for some students is assuming that in order to estimate the answer, they must first solve the problem. Students should use estimation skills such as using benchmark fractions of 0, $\frac{1}{2}$, and 1, prior to solving the problem. Students can use benchmarks to get an estimate without using an algorithm. Estimation encourages reflective thinking and allows students to determine the reasonableness of an answer.

When estimating the number of miles biked each week, it is important for students to recognize that the fraction $12\frac{9}{10}$ is close to 13 and that the fraction $10\frac{1}{12}$ is about 10; therefore, she biked about 3 more miles. Teachers should observe if a student did not use estimation strategies and if they immediately tried to solve the problem procedurally by finding common denominators. Encouraging students to apply estimation strategies to a variety of problems is essential. It is necessary for students to understand the purpose of estimation and its value when solving problems.

If a student is unable to estimate fractions using benchmarks, they may benefit from modeling several fractions with fraction bars and then sorting them into groups based on benchmark thinking (Close to 0, Close to One-Half, Close to a Whole). After sorting with fraction bars, write the fractions for each group, and encourage students to look for patterns in each group. As students explore sorting into benchmark groups, they should begin to notice that fractions that are close to 0 tend to have numerators and denominators that are relatively far apart from each other *(ex: 1 and 9 in $\frac{1}{9}$). Fractions that are close to one-half tend to have numerators that are about half of the denominator (ex: in $\frac{3}{6}$, 3 is half of 6), and fractions that are close to a whole tend to have numerators and denominators that are fairly close to each other (ex; in $\frac{11}{12}$, 11 and 12 are numbers that are very close to each other in counting order) they may begin by using fraction models to compare fractions to common benchmarks. When exploring fractions in relation to benchmarks it is important for students to identify the relationship between the numerator and denominator in order to apply this concept when solving problems. Encouraging students to estimate sums or differences will help students to continue to build fraction number sense.*

3) Kamden walked the first $\frac{2}{5}$ of a mile and then he ran the rest of the distance. If Kamden completed $1\frac{3}{4}$ miles, how many miles did he run?

Some students may add the fractions together instead of finding the difference. Using a bar model or other visual representation may benefit some students when solving this problem. It is important for students to understand that $1\frac{3}{4}$ is the whole and that one part is $\frac{2}{5}$. There are several different strategies that students could use when finding the missing part. One strategy is to add on using a number line, starting at $\frac{2}{5}$ until you reach the fraction $1\frac{3}{4}$. The distance between the two fractions is the difference.

Some students may also make computation errors when solving word problems, such as not finding the common denominator when adding or subtracting fractions. Students may add or subtract the numerators and denominators without regard to like denominators. These students would benefit from additional support with models and in applying estimation strategies when solving problems with fractions.

4) A family bought 2 pizzas, of equal size, for dinner. The family ate $\frac{7}{8}$ of one pizza and $\frac{5}{8}$ of the other pizza. How much pizza did the family eat for dinner? Write the answer in simplest form.

A common misconception when adding or subtracting fractions with like denominators is not understanding the relationship between the numerator and denominator. When solving problems with like denominators, some students will add the numerators and denominators together instead of recognizing that the denominator represents the number of equal parts in which the whole is divided. When adding fractions with like denominators, the number of parts for each whole is the same; therefore, the numerators may be added together representing the number of those parts. If some students have an answer of $\frac{12}{16}$, these students will need additional support with models and/or pictorial representations. When using estimation strategies, such as benchmarks, students should be able to recognize that they ate almost one whole pizza and about $\frac{1}{2}$ of another pizza. Together they ate about $1\frac{1}{2}$ pizzas.

If students were able to successfully add fractions with like denominators, another misconception could be representing the fraction in simplest form. When adding the fractions $\frac{7}{8}$ and $\frac{5}{8}$ the sum is $\frac{12}{8}$ resulting in an improper fraction. It is important for students to understand how to convert an improper fraction to a mixed number. Drawing a pictorial representation or using concrete models is one strategy students could use. The fraction $\frac{12}{8}$ is equal to the mixed number $1\frac{4}{8}$. Some students may recognize that the fraction $\frac{4}{8}$ is equivalent to one-half, while others may need to discover the greatest common factor in order to simplify this fraction. There are several different strategies that students could apply when representing the resulting fraction in simplest form. It is important to help students connect these strategies to develop a greater understanding of fractions.

5) Ava and her mom baked a pan of brownies for dessert. The model below represents one whole pan of brownies.

Ava and her mom ate different amounts of brownies. Together they ate $\frac{5}{12}$ of the brownies. Select the amount of brownies that Ava and her mom each could have eaten. There are two possible answers.

a) Ava ate $\frac{1}{6}$ of the brownies and her mom ate $\frac{4}{6}$ of the brownies.

b) Ava ate $\frac{1}{3}$ of the brownies and her mom ate $\frac{1}{12}$ of the brownies.

c) Ava ate $\frac{3}{8}$ of the brownies and her mom ate $\frac{2}{4}$ of the brownies.

d) Ava ate $\frac{1}{4}$ of the brownies and her mom ate $\frac{1}{6}$ of the brownies.

In this particular question, there are two possible answers. If students selected A as an answer choice, then these students added the numerators and like denominators together to get a sum of $\frac{5}{12}$*. When adding like denominators together students are often treating the numerator and denominator as two separate whole numbers. These students will need additional support with models in order to recognize the relationship between the numerator and denominator, and that the denominator represents the number of equal parts in which the whole is divided.*

If students selected C as an answer choice, then these students did not find a common denominator and instead added the denominators together. These students do not understand that the different denominators represent different-sized unit fractions. When adding fractions with unlike denominators it is important for students to understand the reason for creating equivalent fractions that have common unit fractions, such as a common denominator. Using models and estimation strategies will help students to develop a greater understanding of adding fractions.