Solve Problems Involving Operations with Fractions and Mixed Numbers

Strand:	Computation and Estimation
Topic:	Solve single and multistep practical problems involving operations with fractions and mixed numbers.
Primary SOL:	6.5b The student will
	b) solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of fractions and mixed numbers;
Related SOL:	6.5a

Materials

- Task Cards (attached)
- Notebook paper
- Poster board
- Markers
- Manipulatives, such as fraction strips, number lines, etc.
- Dry erase boards

Vocabulary

division, equivalent, fraction, multiplication, reciprocal (earlier grades)

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Arrange students into pairs. Consider the learning preferences and knowledge level of your students to determine the best structure for sharing work, having meaningful discussions, and their documentation of thinking and problem solving.

2. Tell students that they will discuss their problem solving strategies with their partners as they work together to solve problems. Provide students with the option of using concrete manipulatives, pictorial representations, pencil and paper, or dry-erase boards and markers to communicate their thinking with each other.

3. Distribute one set of task cards to each group.

4. Have the students complete all task cards and record their work on notebook paper.

5. Provide small checkpoint stations around the classroom where students can check their work and ensure that they are on the right path.

6. During the task card activity, students should discuss their problem solving strategies and the mathematics involved and work cooperatively with their partner. Circulate around the room, listening to the group discussions. Take note of things you want to highlight or clarify during the closure of the lesson. It is important to encourage partners to think and reason about the situation in order to understand the context and be able

to determine the solution. It is also important to encourage students to think about and discuss justifications on how the context of the problem leads to the actions required for a computation and what operation is associated with the computation. Some questions that could be used to push student discussions, if they are not sharing their thinking and reasoning, may include:

    a. Visualize the situation and create a mental picture. Can you picture what actions are taking place?

    b. Could drawing a picture be helpful to understanding the problem?

    c. What is the question about the situation that needs to be answered?

    d. What are some things to consider when figuring out what this situation's problem is asking you to find out?

    e. What operation or operations do you think the situation calls for when you get ready to solve the problem? Why?

    f. If you were going to use a manipulative to help you, which would you select and why?

7. For closure, assign each pair one of the task cards to present on poster board. The presentation will include a description of the problem solving strategy the students used. The presentation will also include an illustration of the problem numerically and pictorially.

Assessment

- **Questions**
  - How can we apply what we know about operations with whole numbers to practical problems involving fractions?
  - What are some similarities and differences when multiplying and dividing fractions?

- **Journal/writing prompts**
  - Explain how you and your partner decided which operation to use when solving the problems. Be specific and give examples.
  - Write your procedures for adding and subtracting fractions and mixed numbers and multiplying and dividing fractions and mixed numbers.

- **Other Assessments (include informal assessment ideas)**
  - Have one student create a word problem. Their partner should describe what operation(s) would be needed to solve the problem.
  - Make cards that have multi-operations (e.g., addition and division) on them. Pass one out to each student or pair and have them create a practical problem that uses the two operations.

Extensions and Connections (for all students)

- Have pairs create their own task cards.
- Have students exchange the task cards and explain the solutions to their partners.

Strategies for Differentiation

- Tiles or other manipulatives may be used for concrete thinkers.
- The levels of the task cards vary; therefore, the teacher should be thoughtful about the assignment of tasks that are presented by the partnerships.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

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Task Cards

Print on card stock and cut out.

Tanisha plants $\frac{2}{3}$ of her garden with flowers. She covers $\frac{1}{4}$ of this part of the garden with roses. What part of her whole garden does Tanisha plant with roses?	How many $\frac{1}{8}$-foot long wooden pegs can be cut from a plank that is $\frac{3}{4}$-foot long?
One tree is 6 feet tall. Another tree is only $3\frac{1}{4}$ feet tall. How much taller is the larger of the two trees?	Xing used $\frac{4}{10}$ cup of milk in his cereal at breakfast and drank $\frac{4}{5}$ cups of milk with his lunch. What fraction of a cup of milk did Xing have?
Tony purchased a 15-foot-long sub for a party. He cuts the sandwich into $\frac{5}{12}$-foot sections. Into how many pieces does he cut the sandwich?	On Monday, Mark ran $1\frac{1}{3}$ miles to school and then $2\frac{1}{5}$ miles to his grandmother's house after school. On Tuesday, he ran twice as much as the previous day. How far did Mark run on Tuesday?

Tanisha plants $\frac{2}{3}$ of her garden with flowers. She covers $\frac{1}{4}$ of this part of the garden with roses. What part of her whole garden does Tanisha plant with roses?	How many $\frac{1}{8}$-foot long wooden pegs can be cut from a plank that is $\frac{3}{4}$-foot long?
A recipe for a cake calls for $1\frac{1}{2}$ cups of sugar. Madison wants to make $\frac{1}{2}$ of the recipe to make a cake to share with her little sister. How many cups of sugar will she need? Madison decides to make 2 cakes so that she may share with the students in her class. How many cups of sugar will she need?	A bag contains $10\frac{3}{4}$ cups of almonds. A serving of almonds is $\frac{1}{4}$ cup. How many servings of almonds does the bag contain?
Jasmine wants to organize her books in order of most number of pages to least number of pages. Jasmine's longest book has 96 pages, and her shortest book has one-fourth as many pages as the longest. If the book in the middle of her shelf has three times the number of pages of the shortest book, then how many pages does the middle book have?	Steven swam $2\frac{1}{3}$ miles at swim team practice. If Crystal swam $1\frac{1}{2}$ times as far as Steven, then how many miles did Crystal swim?

Tanisha plants $\frac{2}{3}$ of her garden with flowers. She covers $\frac{1}{4}$ of this part of the garden with roses. What part of her whole garden does Tanisha plant with roses?	How many $\frac{1}{8}$-foot long wooden pegs can be cut from a plank that is $\frac{3}{4}$-foot long?
Darren spent $2\frac{1}{2}$ hours on his homework on Wednesday. On Thursday, he spent $1\frac{3}{5}$ hours on his homework. Find the total amount of time in hours that he spent doing his homework on the two days.	Hannah has a ribbon that is $6\frac{1}{3}$ inches long. If she cuts of $2\frac{3}{4}$ inches, how much ribbon does she have left?