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)
- Question Stems activity sheet (attached)
- Sample Responses (attached)
- Notebook paper
- Poster board
- Markers

Vocabulary

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

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

1. Distribute the Question Stems activity sheet.
2. Ask students to identify phrases that indicate which operation you need to solve practical problems involving fractions. See Sample Responses (attached).
3. Allow students to collaborate with a partner in developing the phrases. Solicit responses and record on the board. Instruct students to record responses on their Question Stems activity sheets. Advise students that they may use their notes later on in the lesson.
4. Divide students into pairs. Distribute one set of task cards to each group.
5. Have the students complete all task cards and record their work on notebook paper.
6. Provide small checkpoint stations around the classroom where students can check their work and ensure that they are on the right path.
7. During the activity, students should discuss the mathematics involved and work cooperatively with their partner.
8. Assign each pair one of the task cards to present on poster board. The presentation will include a description of how the students decided on the operation to use. 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)

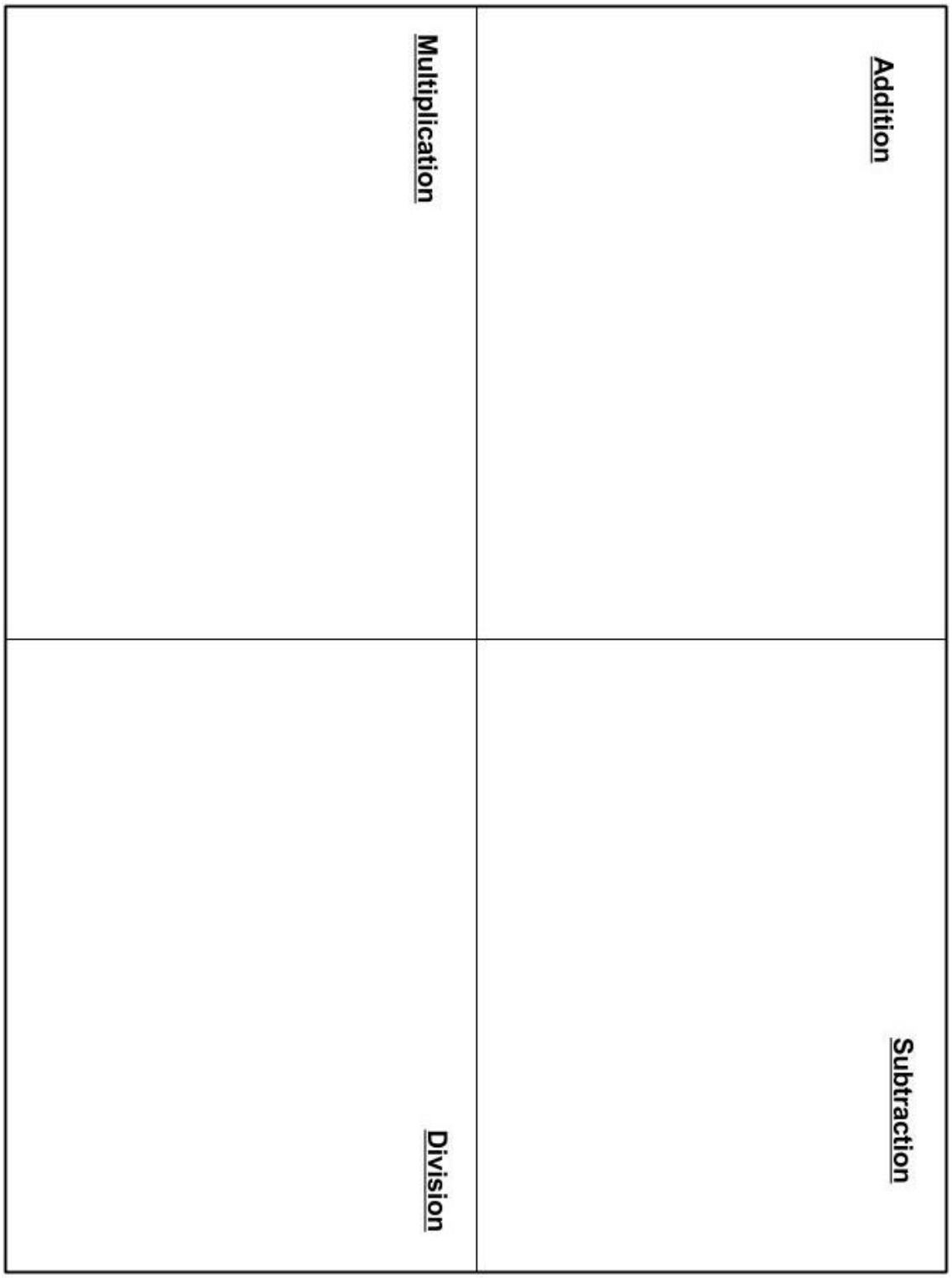
- Have pairs create their own task cards.
- Have students exchange the task cards and explain the solutions to their partners.

Strategies for Differentiation

- Use colored paper for the notes or have students create a foldable. Preprinted notes may be available for students with writing difficulties.
- 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.

Question Stems



Sample Responses

Addition: "How much together?" "How much combined?" "What is the total?"	Subtraction: "How much more is needed?" "How much farther than?" "How much is left?"
Multiplication: "How many times longer?" "The product of …" "A fraction of …"	Division: "Find the quotient …" "How can you share?" "How many will fit into?" "How many can be split from …?" "Cut into pieces …"

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?

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?
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?