Fraction Strip Addition and Subtraction/Four-in-a-Row – A Co-Teaching Lesson Plan

Co-Teaching Approaches
A "(Y)" in front of the following list items indicates the approach is outlined in the lesson. An "(N)" in front of the following list items indicates the approach is not outlined in the lesson.

- (Y) Parallel Teaching
- (Y) Team Teaching
- (Y) Station Teaching
- (N) One Teach/One Observe
- (N) Alternative Teaching
- (N) One Teach/One Assist

Subject
Grade 4 Mathematics

Strand
Computation and Estimation

Topic
Adding and Subtracting Fraction to Decimal Equivalents

SOL
4.5   The student will
   b) add and subtract fractions and mixed numbers having like and unlike denominators.

Related SOL
4.3   The student will
   a) read, write, represent, and identify decimals expressed through thousandths;
   d) given a model, write the decimal and fraction equivalents.

Outcomes
The students will add and subtract fractions having like and unlike denominators that are limited to 2, 3, 4, 5, 6, 8, 10, and 12 and simplify the resulting fractions, using common multiples and factors.

Materials

- Sets of Fraction Strips (attached)
- Fraction Sum Sheet (attached)
- Four-in-a-Row Fraction Chart (attached)
- Four-in-a-Row Game Board (attached)
- Four-in-a-Row Recording Sheet (attached)
- Warm-up activity sheet (attached)
- Board markers in two different colors

Note: Before undertaking this activity, make a complete set of fraction strips—one strip each for whole (1 unit), two halves, three thirds, four fourths, and so forth—for each student. Copy each sheet of the attached fraction strips on a different color of card stock and cut out the strips. Because each strip is the same length, they can be overlapped and/or folded to work problems and will probably be easier to use in complete-strip format. If a student has difficulty understanding overlapping, the strips may be cut apart. Also, create a set of attached fraction cards for each group. This activity can also be done with fraction squares or circles, egg cartons, or other fraction manipulatives.

Vocabulary

common factors, common multiples, difference, estimation, factor, fraction, greatest common factor (GCF), improper fraction, least common denominator, least common multiple (LCM), like denominators, mixed number, simplify, simplest form, subtract, unlike denominators

Co-Teacher Actions

Lesson Component	Co-Teaching Approach(es)	General Educator (GE)	Special Educator (SE)
Anticipatory Set	Team Teaching	Using the Warm-up activity sheet, give the students two sets of problems represented as models. Ask students to determine the sum of the fractions and the difference between the fractions by shading the provided pictures. This activity is designed as a pre-assessment.	Monitor student work on the warm-up, looking for misconceptions to address during the discussion of the warm-up. Select several students to share their thinking with the class. Facilitate this discussion, asking "Why?" questions of the class.

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Lesson Activities/ Procedures	Station Teaching Students are to spend time with each teacher.	1. Give each student a complete set of fraction strips. Distribute the Fraction Sum Sheet for students to model several problems for the class. For example, "Add the fractions one-half and one-quarter on your unit strip. What is the sum?" (3/4) "Is there another way, with different strips, to cover your answer?" How would we express this fraction? "Therefore, what is another way to express three-fourths as a fraction?" (6/8) 2. Ask, "What is a good estimate of the sum of three-fourths and three-eighths? Will this be more than half but less than one, more than one, more than two?" Student pairs should discuss how to determine this and determine their answer. Monitor student discussions and select three or four students with different approaches to share their thinking with the group. Ask questions to get students to compare the different strategies. You may need to introduce them to referencing the space on a number line between zero and 1 to guide their thinking. 3. Ask students, "What is a good estimate of the sum of two-thirds and three-	1. Give each student a complete set of fraction strips. Hold up the unit (1) strip and ask, "What does this represent?" (one unit or one whole) Ask, "How many fourths make up this unit? (4) Pose the problem, "Place the unit and the four fourths fraction strips in front of you. If this unit (one whole) represents a candy bar and I give one-fourth of it to Sue, how much of the candy bar remains?" (3/4) Continue, "If I give an additional three-eighths of the candy bar to Joe, how much of the original candy bar will be left for me?" Encourage students to explore with the one-eighth strips to discover the answer. (3/8) Continue with more examples, allowing sufficient time for students to explain their reasoning. 2. Once students understand the process of using fraction strips to subtract a fraction from a whole unit, group students into pairs or small groups to play the Take One game. Give each group a set of the attached fraction cards (or other fraction cards). Model the game for the class, using fraction strips. Start with the unit strip, subtract one-third from it, and ask for the

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		fourths?" Student pairs should discuss how to determine this and determine their answer. Monitor student discussions and select three or four students with different approaches to share their thinking with the group. Ask questions to get students to compare the different strategies.
		
		Make sure that all students understand that 17 twelfths, or one whole and five twelfths, will model this sum exactly. The more experience students have with discovering equivalent fractions, the easier it will be for them to understand simplifying fractions. Transparent copies of the fraction strips might help. Do not mention rules for addition unless students bring them up. **The emphasis here should be on visualization of the fraction sum and visualization of an equivalent sum.**
		
		4. Display the following fraction problems, and instruct student pairs to work with their fraction strips to find the sums and to record the equivalent fractions they used.
		
		  a. $\frac{5}{12} + \frac{1}{3}$
		
		  b. $\frac{1}{8} + \frac{1}{4}$
			result: "Is there another way to express this difference, using a different set of fraction strips?"
			
			Student pairs should discuss how to determine this and determine their answer. Monitor student discussions and select three or four students with different approaches share their thinking with the group. Ask questions to get students to compare the different strategies.
			
			Then, subtract one-fourth from that result, using twelfths pieces. Let students explore and determine this result, then share with the group.
			
			Make sure to give students ample time to explore and make some discoveries for themselves before telling them how to play the Take One game, as follows:
			
			• Players begin with the whole unit strip or the two-halves strip.
			
			• Player 1 draws a fraction card from the pile and subtracts the amount shown from the whole or two halves, keeping track of what is left with the fraction strips. Substitute equivalent fractions, as needed.

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		c. $\frac{5}{8} + \frac{7}{8}$ d. $\frac{2}{3} + \frac{5}{6}$ e. $\frac{7}{10} + \frac{1}{2}$ f. $\frac{5}{6} + \frac{2}{3}$ 5. Ask each pair to discuss the strategies they used, and have students look for patterns. If time, display the problem $\frac{3}{4} + \frac{7}{8}$. Ask each student to find the sum and create a problem situation to match the number sentence. Encourage drawings or diagrams. Allow each group time to discuss their answers, and then call for responses.	• Players alternate turns, with each player drawing a card, subtracting, and keeping track of what is left. • The first player with a blank board wins. 3. Ask the pairs of students which is larger: seven-eighths or one-half? Pairs discuss and then share their thinking with the group. Ask, "How much bigger?" Call on volunteers to model their work. Ask the "Why?" questions, making sure everyone understands the thinking. If necessary, model the problem for the students. 4. Ask the groups to model the following problems, one at a time, and record their models by drawing on paper. Ask students also to write the fractions next to the representation of each problem. Students need to connect the model with the written problem. Have them demonstrate and explain correct solutions to the group. Students can also create problem situations for these number sentences. a. $\frac{2}{3} - \frac{1}{9}$

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			b. $\frac{3}{4} - \frac{5}{8}$ c. $\frac{10}{12} - \frac{3}{6}$ d. $\frac{4}{5} - \frac{4}{10}$ e. $\frac{1}{2} - \frac{1}{6}$ 5. If time, ask students to model a solution to the following problem, record a diagram or picture of their model: "Brad has 3/4 of a pound of fudge, and Julie has 7/8 of a pound. Together, do they have enough fudge to serve 12 people 1/8 of a pound of fudge each?" Solutions will vary, but all students should come to understand that Brad and Julie have a total of 13/8 pounds of fudge—i.e., enough to serve 13 people 1/8 of a pound each.
Guided/Independent Practice	Parallel Guided Practice/Parallel Teaching	Say: Today we are going to play a game. 1. Present the following word problem to the class: "One-half of the students in Mr. Joy's class bought lunch yesterday, while three-eighths of the students brought their lunch. The remainder of the class went home before lunch. What fractional part of the class went home before lunch?"	Same as GE.

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		Have the students work in pairs to solve this problem. Monitor students as they work, listening for misconceptions, solution strategies, asking the "Why?" and "How do you know?" questions. Select several students to share their thinking with the group. 2. After the problem has been solved and discussed, give each pair of students a copy of the Four-in-a-Row Fraction Chart, a copy of the Four-in-a-Row Game Board, and two copies of the Four-in-a-Row Recording Sheet. Also give each pair piles of board markers in two colors. Have the pairs play the Four-in-a-Row Game, as follows: • Each pair of students decides who goes first. • Player 1 chooses from the fraction chart two fractions that can be added or subtracted to get one of the answers shown on the game board. Player 1 must demonstrate the problem with the fraction strips or another manipulative, after which he/she may cover the answer on the board with a marker. Once a fraction has been	

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		covered, it may not be used again. • Both players record the problem and its solution on their recording sheet. • Player 2 takes a turn. • Play continues until someone covers four fractions in a row— horizontally, vertically, or diagonally. 3. TE and SE monitor student work and discussions, asking the "Why?" and "How?" questions, listening for understanding and the appropriate use of vocabulary. Select students and specific combinations that can be discussed during the closing activity.	
Closure	Team Teaching	Have the class discuss the problems and solution strategies chosen during the game activity. Get students to generalize what they have learned about adding and subtracting fractions. Which problems are easiest to do? Most difficult? Why?	Record student thinking and generalizations as students are explaining their thinking. Use this to ask further clarifying questions.
Formative Assessment Strategies		During lesson: • Monitor oral responses.	Ask students the following: "How do manipulatives help with solving these problems?" "Are there other methods to solving these problems? If so, what are

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		• Monitor written responses while working individually and with partners. • Monitor student discussions, asking why and how questions. Keep anecdotal records of what work was understood and what concepts needed to be explained or modeled more.	they?" "Is there more than one way to get an answer on the game board?" • Monitor oral responses. • Monitor written responses while working individually and then with partners. Keep anecdotal records of what work was understood and what concepts needed to be explained or modeled more.
Homework		**Teacher:** Tell students to choose one activity for homework. **Student Choice 1** Choose an addition or subtraction problem you created during this game, and draw a picture to model the process of finding the answer. **Student Choice 2** Choose an addition or subtraction problem you created during this game, and write a word problem that fits that problem.	**Teacher:** Tell students to choose one activity for homework. **Student Choice 1** Choose an addition or subtraction problem you created during this game, and draw a picture to model the process of finding the answer. **Student Choice 2** Choose an addition or subtraction problem you created during this game, and write a word problem that fits that problem.

Specially Designed Instruction
- Use a variety of fraction manipulatives and visuals
- Provide students with step-by-step instructions, with frequent verbal feedback and reinforcement
- Begin instruction with fractions with the same denominator, and introduce different denominators in a sequential manor (for example, first show denominators that are factors/multiples of each other).

Accommodations
- Fraction strips could be cut apart to help understand the idea of finding common denominators.
- Have students use a variety of manipulatives as tools to help them add fractions having like and unlike denominators.
- Pre-cut and color the fraction strips
- Reduce number of problems/examples

Modifications
- For those students requiring a modified curriculum, content can be simplified to include fractions with the same denominator or fractions with limited numbers for the denominator, such as halves and fourths.

Notes
- "Special educator" as noted in this lesson plan might be an EL teacher, speech pathologist, or other specialist co-teaching with a general educator.

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

Fraction Sum Sheet

Fraction Denominator

$$\frac{\square}{\square} = \frac{\square}{\square}$$

+

$$\frac{\square}{\square} = \frac{\square}{\square}$$

↓

Sum
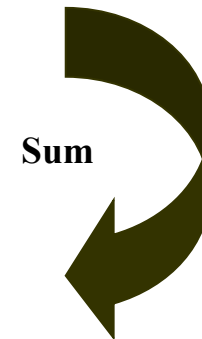
Fraction Strips – One Whole (One Unit)

1
1
1
1
1

Fraction Strips – Fourths

$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$
$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$
$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$
$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$
$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$	$\dfrac{1}{4}$

Fraction Strips – Halves

$\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$

Fraction Strips – Eighths

$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$
$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$
$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$
$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$
$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$	$\dfrac{1}{8}$

Fraction Strips – Tenths

$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

Fraction Strips – Thirds

$\dfrac{1}{3}$	$\dfrac{1}{3}$	$\dfrac{1}{3}$
$\dfrac{1}{3}$	$\dfrac{1}{3}$	$\dfrac{1}{3}$
$\dfrac{1}{3}$	$\dfrac{1}{3}$	$\dfrac{1}{3}$
$\dfrac{1}{3}$	$\dfrac{1}{3}$	$\dfrac{1}{3}$
$\dfrac{1}{3}$	$\dfrac{1}{3}$	$\dfrac{1}{3}$

Fraction Strips – Sixths

$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$
$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$
$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$
$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$
$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$	$\dfrac{1}{6}$

Fraction Strips – Twelfths

$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$
$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$
$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$
$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$
$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$	$\dfrac{1}{12}$

Four-in-a-Row Fraction Chart

$\dfrac{7}{8}$	$\dfrac{1}{2}$	$\dfrac{1}{4}$	$\dfrac{1}{3}$
$\dfrac{2}{5}$	$\dfrac{2}{3}$	$\dfrac{3}{4}$	$\dfrac{2}{4}$
$\dfrac{1}{8}$	$\dfrac{5}{8}$	$\dfrac{3}{6}$	$\dfrac{6}{8}$
$\dfrac{3}{5}$	$\dfrac{4}{5}$	$\dfrac{3}{8}$	$\dfrac{1}{5}$
$\dfrac{9}{10}$	$\dfrac{7}{12}$	$\dfrac{3}{10}$	$\dfrac{5}{12}$

Four-in-a-Row Game Board

$\dfrac{1}{4}$	$\dfrac{3}{8}$	$\dfrac{2}{3}$	$\dfrac{1}{2}$
$\dfrac{3}{4}$	$\dfrac{1}{12}$	$\dfrac{7}{8}$	$\dfrac{1}{8}$
$\dfrac{5}{8}$	$\dfrac{1}{12}$	$\dfrac{11}{8}$	$\dfrac{3}{2}$
$\dfrac{13}{10}$	$\dfrac{9}{8}$	$\dfrac{5}{4}$	0

Four-in-a-Row Recording Sheet
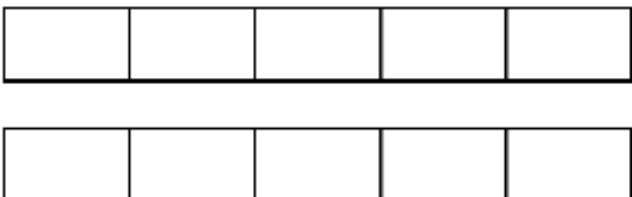
Fraction	Operation (+) or (-)	Fraction	Sum or Difference

Warm-up

Shade to determine the following:
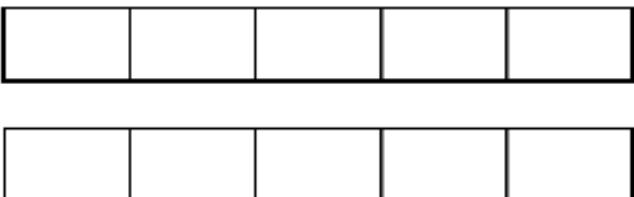
1.

$$\frac{1}{2} + \frac{1}{4} =$$

3.

$$\frac{1}{2} - \frac{1}{4} =$$

2.

$$\frac{3}{5} + \frac{2}{5} =$$

4.

$$\frac{3}{5} - \frac{2}{5} =$$