Grade 5
Mathematics
Unit 7: Addition and Subtraction of Fractions

Time Frame: Approximately six weeks

Unit Description

This unit focuses on equivalency, adding and subtracting fractions, writing equations to model problems involving fractions, and solving word problems involving fractions.

Student Understandings

Students will use addition and subtraction of fractions to solve real-life problems and will determine if their answers make sense and are reasonable.

Guiding Questions

1. Can students add or subtract two fractions?
2. Can students check to see if two different answers for a fraction operation problem are equivalent?
3. Can students write and solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators?
4. Can students write fraction equations and inequalities and represent the answers on a number line?

Unit 7 Grade Level Expectations (GLEs) and Common Core State Standards (CCSS)

Grade-Level Expectations	
GLE #	**GLE Text and Benchmarks**
Number and Number Relations	
2.	Recognize, explain, and compute equivalent fractions for common fractions (N-1-M) (N-3-M)
4.	Compare positive fractions using number sense, symbols (i.e., <, =, >), and number lines (N-2-M)
6.	Select and discuss the correct operation for a given problem involving positive fractions using appropriate language such as *sum*, *difference*, *numerator*, and *denominator* (N-4-M) (N-5-M)
9.	Use mental math and estimation strategies to predict the results of computations (i.e., whole numbers, addition and subtraction of fractions) and to test the reasonableness of solutions (N-6-M) (N-2-M)
Algebra	
14.	Find solutions to one-step inequalities and identify positive solutions on a number line (A-2-M) (A-3-M)

CCSS for Math Content	
CCSS#	**CCSS Text**
Number and Operations-Fractions	
5.NF.1	Add and subtract fractions 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.
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.
Speaking and Listening Standards	
SL.5.1c	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.

Sample Activities

Activity 1: All About Fractions (GLEs: 2, 4; CCSS: SL.5.1c)

Materials List: paper, pencils

Assign each group of students a different fraction. The groups should list some things they know about their fraction. To review fraction concepts from Unit 4, use "*professor-know-it-all*" (view literacy strategy descriptions). A group will be called on randomly to come to the front of the class to be a team of "*professors-know-it-all*" about their fraction. Invite questions from other groups. Some questions might be the following for $\frac{3}{6}$: What is the numerator of your fraction? *(3)* Is your fraction greater or less than $\frac{3}{5}$? *(less than)* What is a fraction equivalent to yours? *(*$\frac{1}{2}$, $\frac{6}{12}$, *etc.)* Would you draw a picture of your fraction? *(Answers will vary.)* What is your fraction written as a decimal? *(0.5)* The team should be able to answer questions involving equivalency, simplest terms, comparison, and different representations. Other students should listen for accuracy and logic in the *professors-know-it-all*' answers to their questions. After about 5 minutes or so, ask a new group to take its place in front of the class. Consider doing this activity again with mixed numbers and decimals.

Activity 2: Make That Fraction (GLEs: 2, 4; CCSS: SL.5.1c)

Materials List: Make That Fraction BLM, two number cubes labeled 1-6 for each pair of students, pencils, Fractions and Decimals Anticipation Guide Statements BLM

Distribute the Make That Fraction BLM to students. Students should work in pairs, but each student needs a copy of the BLM. The first player rolls the two number cubes and uses the number to create one fraction to fit one of the descriptions. For example, if a student rolls 3 and 5, the student could use $\frac{3}{5}$ as a fraction > $\frac{1}{2}$, a fraction in simplest form, or a fraction < 1. Or they could use the fraction $\frac{5}{3}$ as a fraction > 1, a fraction between 1 and 2, or a fraction > 1/2. Players take turns. If a player cannot make a fraction to match a description, the player loses a turn. The first player to complete the entire sheet is the winner.

After playing the game, present students with an *anticipation guide* (view literacy strategy descriptions) to challenge their understanding of fractions and decimals. *Anticipation guides* force students to take a stand and to defend their reasoning. *Anticipation guides* are especially useful to struggling and reluctant learners as they heighten motivation and focus attention on important information. Give each student a copy of the Fractions and Decimals Anticipation Guide Statements BLM. Tell the students to think about what they already know about fractions and use that knowledge to answer the guide. Invite students to share their answers and discuss the different viewpoints. Do not give away the answers at this point. As information is covered related to fractions and decimals during this unit, have students return to the *anticipation guide* and adjust their answers and reasoning as needed. Invite students to share and discuss their responses to the *anticipation guide* statements as their understanding of the concepts mentioned in the guide develops. Make sure students' responses are accurate.

Activity 3: Cover Up/Uncover (GLE: 2)

Materials List: Fraction Strips A-F BLMs or fraction circles, colored stock paper, scissors, Fraction Spinners BLM, paper clip, paper, pencils

Run copies of the Fraction Strips A-F BLMs. Run each on a different color stock paper. Provide each student with one of the strips in each color. One strip should be left as the whole unit, while the other strips should be cut into halves, fourths, eighths, thirds, and sixths.

Have students play the game *Cover Up*. (This could be done with fraction circles, rather than the strips.) Provide each pair of students with the Fraction Spinners BLM. A paper clip and pencil can be used as a spinner. Have students choose one of the spinners and the corresponding fraction parts, either halves, fourths, and eighths or halves, thirds, and sixths. Have each student lay out the "whole" strip. The first student spins and covers that

amount on his/her "whole" strip. Students take turns spinning until they cover the entire strip. The amount covered cannot exceed the "whole." To play Uncover, students cover the entire "whole" strip with the fraction pieces, spin, and uncover until the entire strip is uncovered. For each game, have the students write the number sentence, or equation, for each spin. For example, if they have $\frac{1}{8}$ covered and spin $\frac{3}{8}$, the number sentence would be $\frac{1}{8}+\frac{3}{8}=\frac{4}{8}$. Students could use other equivalent pieces to cover their strip. For example, if students spin $\frac{2}{8}$, they could use the $\frac{1}{4}$ piece to cover. Students can cover up 1 whole and a half or 2 whole strip to vary the activity. When enough time is given to the activity, have students explain how the activity helped them find equivalent fractions.

Have students keep the fraction strips to be used in later activities.

Activity 4: Fraction Strips I (CCSS: 5.NF.2)

Materials List: fraction strips from Activity 3, paper, pencils

Have students use the paper strips from Activity 3. Ask students to write the equation for their problems along with the visual models. Give students problems to model such as these:

- Cheri ate $\frac{1}{4}$ of the Power Bar at breakfast and $\frac{2}{4}$ of the Power Bar at lunch. How much of the Power Bar did she eat? ($\frac{1}{4}+\frac{2}{4}=\frac{3}{4}$).
- Sandra was typing a report that was due. She typed $\frac{3}{8}$ of the report yesterday and $\frac{4}{8}$ today. How much more needs to be typed before the report is finished?
- Charley had $\frac{3}{8}$ of a Power Bar in his pocket. He ate $\frac{1}{8}$ of it. How much of the Power Bar is left? ($\frac{3}{8}-\frac{1}{8}=\frac{2}{8}$) When an answer, such as $\frac{2}{8}$, can be written in a simpler form, have students find equivalent fraction pieces to find the simpler form. Emphasize that both answers are correct because they are equivalent fractions.
- Charley had 7/8 of a Power Bar in his locker. 2/4 of it melted. How much of the Power Bar did not melt? (7/8 – 2/4 = 3/8) When a problem has unlike denominators, have the students find equivalent fractions pieces to find the common denominator. In this case 2/4 equivalent is 4/8 and 7/8 – 4/8 = 3/8.
- Give word problems that involve answers that will be greater than 1 whole, such as: Johnny added ¾ cup of sugar to the mixing bowl. After adding 2 eggs, he added ¾ cup more to the mix. How many cups of sugar did he add? To show fractions greater than 1, have two students work together. For fractions greater than 1, emphasize writing both mixed numbers and improper fractions.

2013-2014
Activity 5: Fraction Strips II (CCSS: 5.NF.1)

Materials List: fraction strips from Activity 3, paper, pencils

Review adding and subtracting fractions problems like those in activity 4. When appropriate time has been given to adding and subtracting fractions with like denominators, give students problems to model such as this: Cheri ate $\frac{1}{2}$ of a Power Bar at breakfast and $\frac{1}{3}$ of the Power Bar at lunch. How much of the Power Bar did she eat? Ask the students if she could have eaten $\frac{2}{5}$ of the Power Bar. Listen attentively to the answers given. Have students take out the fraction strips from Activity 3. To clarify why $\frac{2}{5}$ cannot be the correct answer, ask the students to find the $\frac{1}{2}$ strip and the $\frac{1}{3}$ strip and place them together. Tell the students that the two strips together is the total. Ask them what unit they should use to name the amount. Tell them that it cannot be called halves or thirds, but that a new unit must be found. Ask them if there is a way to divide the ½ and the 1/3 strips into parts that have the same name. Allow students to try the different fraction strips and to come to the conclusion that the ½ strip and the 1/3 strip could be broken into 6ths. Have students see that $\frac{3}{6}$ is equivalent to $\frac{1}{2}$ by lining the $\frac{3}{6}$ strip under the $\frac{1}{2}$ strip. Have them see $\frac{2}{6}$ is equivalent to $\frac{1}{3}$ by lining the $\frac{3}{6}$ strip under the $\frac{1}{3}$ strip. Have the students add the pieces to see that $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$. Allow students to solve other problems with unlike denominators and when enough time is given to the activity, allow students to share their experiences.

2013-2014
Activity 6: Finding Common Denominators (CCSS: 5.NF.1)

Materials List: fraction strips from Activity 3 or fraction circles, paper, pencils, index cards, black markers

Using the paper strips from Activity 3 or fraction circles, have the students use a $\frac{1}{3}$ strip and a $\frac{1}{4}$ strip. Have students think of a way to divide the two strips using other strips. Tell students that they are going to find a common denominator. Writing unlike fractions with a common denominator allows them to add two unlike fractions. $\frac{1}{3}$ and $\frac{1}{4}$ can each be divided using the 12ths strips. 12 is a common denominator. There are 4 twelfths in $\frac{1}{3}$ and there are 3 twelfths in one $\frac{1}{4}$. So $\frac{1}{3}$ and $\frac{1}{4}$ can be rewritten as $\frac{4}{12} + \frac{3}{12}$, which is $\frac{7}{12}$. Another way to find a common denominator without using the strips is to multiply the two denominators, so $3 \times 4 = 12$. 12 is a common denominator. Ask students to find a common denominator using ½ and 1/3 (6).
Have students find a common denominator for the following:

$\frac{1}{3}, \frac{1}{5}$; $\frac{1}{2}, \frac{1}{7}$; $\frac{1}{9}, \frac{1}{3}$; $\frac{1}{5}, \frac{1}{10}$

Help the students understand that multiplying the denominators will always give a common denominator between the two fractions; however, in the case of $\frac{1}{9}$ and $\frac{1}{3}$ or $\frac{1}{5}$ and $\frac{1}{10}$, the denominator found by multiplying is not always the smallest denominator. Ask students if they can think of another common denominator for $\frac{1}{9}$ and $\frac{1}{3}$ that is less than 27 (9). Tell them that if they think of the strips, $\frac{1}{3}$ could be divided into ninths. $\frac{1}{3} = \frac{3}{9}$, so 9 is a common denominator. Ask them if they can find any smaller denominator that $\frac{1}{3}$ and $\frac{1}{9}$ have in common. Since they cannot, tell them that 9 is the least common denominator. Help the students see that 9 is a multiple of both 9 and 3 and can be used as the least common denominator.

Ask the students if they can think of another common denominator for $\frac{1}{5}$ and $\frac{1}{10}$ that will be less than 50. (10) Help students see that 10 is a multiple of both 10 and 5. In both cases, the largest unlike denominator of the two fractions was the least common denominator. This was because the denominator was a multiple of itself and the other denominator. This will not always be the case. For the fractions ¼ and 1/6, 24 is a common denominator, but it is not the smallest common denominator. But neither 4 nor 6 can be used as the common denominator. There is a smaller common denominator for these two denominators, and it is 12.

Another way to find the least common denominator of two fractions is to list multiples of each denominator. When students find the smallest multiple, that number will be the least common multiple or least common denominator.

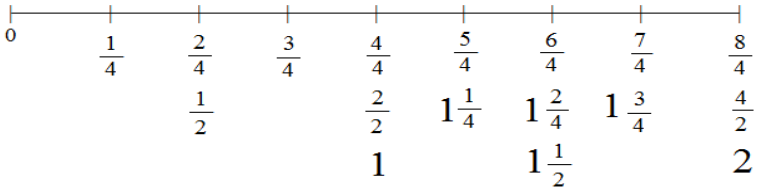
For example, for the fractions $\frac{1}{4}$ and $\frac{1}{5}$, have students list the multiples of 4 and 5
4: 4, 8, 12, 16, 20, 24, 28
5: 5, 10, 15, 20
Both denominators have 20 as a multiple, so 20 is the least common multiple or least common denominator. Give students other pairs of fractions and have them find the least common denominator. When students have this understanding, allow them to play "Common Denominator Battle" game.

Have students work in pairs. Issue at least 20 index card to each pair and ask the pair to write the following numbers on the index cards: 10, 20, 30, 40, 50, 20, 4, 5, 6, 11, 12, 14, 15, 16, 18, 19, 21, 24, 27. Have them divide the pile of index cards into two smaller piles. Have each student take one of the smaller piles. When they begin, both partners will call out "1, 2, 3…battle!" and simultaneously turn over the top card in their piles and place the two cards between them. The pair will then calculate the lowest common multiple of the numbers on the cards and call it out. The first partner to call out the correct lowest common multiple wins the round and will add the cards from that round to the bottom of his/her pile. The rounds of the game will continue in like fashion. The game will end when a partner runs out of cards. The partner with cards remaining is the winner. To vary the game, choose numbers other than those given to add to their pile.

2013-14
Activity 7: Operations on a Number Line (CCSS: 5.NF.1)

Materials List: Number Lines BLM, pencils, The Internet (optional)

Give students the Number Lines BLM. Have them label each mark on the number lines with thirds, fourths, sixths, and eights. Label equivalent fractions on the line as well. An example is shown below.



For example, on line A, for $\frac{1}{2}$, also label $\frac{2}{4}$. For 1, also label $\frac{2}{2}, \frac{4}{4}$ and for 2, also label $\frac{4}{2}$ and $\frac{8}{4}$. For $1\frac{1}{4}$, also label $\frac{5}{4}$; for $1\frac{3}{4}$, also label $\frac{7}{4}$; and for $1\frac{1}{2}$, also label $1\frac{2}{4}$, $\frac{3}{2}$ and $\frac{6}{4}$. Give students addition and subtraction problems, such as $\frac{1}{4}+\frac{3}{4}, \frac{2}{4}+\frac{3}{4}$ and $\frac{3}{2}-\frac{1}{2}$. Bring in estimation questions, such as this: If I subtract $\frac{1}{2}$ from $\frac{4}{2}$, will my answer be greater or less than 1? Ask students to solve addition and subtraction problems with unlike denominators such as $\frac{5}{6}-\frac{2}{3}$, $\frac{7}{8}+\frac{1}{4}$, $\frac{5}{8}+\frac{1}{3}$, and $\frac{3}{6}-\frac{1}{8}$. The website http://www.visualfractions.com has a lesson that uses number lines or fraction circles to add and subtract fractions. The game, *Find Grampy*, focuses on estimating fractions on a number line. The game, *Cookies for Grampy*, focuses on using different pieces to make a whole cookie. To access these games, type the following into your web browser: http://www.visualfractions.com/Games.htm.

Use *student questions for purposeful learning (SQPL)* (view literacy strategy descriptions) to challenge students about their ideas of adding fractions and equivalency. Put the following statement on the board. "Jorge says $\frac{1}{8}+\frac{3}{8}=\frac{4}{8}$; Lilitia says $\frac{1}{8}+\frac{3}{8}=\frac{1}{2}$; and Mia says $\frac{1}{8}+\frac{3}{8}=\frac{4}{16}$. Who is correct? Have students work with partners to brainstorm 2-3 questions that would have to be answered to determine who is correct. Some questions might include these:

- Could all of the students be correct?
- Are all of the answers equivalent?
- Could you use the number line to check each answer?
- Are some answers in lowest terms?
- What mistakes might have been made when adding fractions?

Have student pairs present one of their questions to the class. Write the questions on the board. Reread the opening statement, and as a class work through the fraction problems. While doing so, have students answer each of their *SQPL* questions, and then decide which student had the correct answer. *(Jorge and Lititia are correct.)*

Activity 8: Writing about Computation (GLEs: 6; CCSS: 5.NF.2)

Materials List: paper, pencils

Using a scenario of a trip to a pizza parlor, have students write a math *text chain* (view literacy strategy descriptions) about fractional parts of pizza. Inform the students that a large pizza (12 slices) was purchased in this scenario. Groups are to be encouraged to create addition and subtraction problems about the pizza slices in their *text chain*. Each student in the group contributes a part to the *text chain*.

For example, one group might start a *text chain* with the first students' writing the opening sentence of this problem.

Jeanne ate one-eighth of the pizza.

The student passes the paper to the student sitting to the right. That student writes the next sentence in the story, which might be:

Derrick ate two-eighths of the pizza.

The paper is passed again to the right. This student writes the question for the story.

How much of the pizza did they eat?

The paper is now passed to the fourth student who must solve the problem and write the answer in a complete sentence.

They ate $\frac{3}{8}$ *of the pizza.*

Students in the *text chain* groups should talk about the accuracy of the answer and the logic of the problem. If necessary, revisions to the *text chain* should be made. Have groups present their problems to the class. Ask questions of them, such as: What operation should you use to solve the problem? Would $\frac{3}{8}$ be a reasonable answer? Why, or why not? Tell students that their problems can involve more than one operation and can involve estimation. Be sure that students check the *text chains* for logic and accuracy once they are completed. You can also allow groups to exchange their *text chains* to check for accuracy.

Activity 9: The Gist of Word Problems (GLEs: 6; CCSS: 5.NF.2)

Materials List: Visually Representing Word Problems BLM, pencils

Teacher Note: *Through summarizing word problems (especially constructive response types), students will end with a statement that they can use to compute an answer. Through GISTing, they eliminate all information irrelevant to solving the problem. It will be beneficial when too much information is given in a problem. By learning the GISTing strategy, they can gist through the relevant information and leave out the unnecessary. It can also help them deduce if there is enough information to solve a problem. By writing their own word problems, they will gain ownership in the activity. The second activity focuses on using the gist that was created to actually solve the problem using visual*

models and/or equations. This will give importance to learning how to use GISTing and how to visually represent the problem.

Explain to students that they will use *GISTing* (view literacy strategy descriptions) to help them understand what a word problem is asking them to do. *GISTing* is a summarizing technique that requires students to limit the gist of a text to a set number of words. Sentences from a text are presented one at a time while students create a gist that contains only the essential information from each succeeding sentence until a final gist is derived. Discuss with students what a gist is and why it is a useful strategy. *GISTing* is basically the process of summarizing information. Model the gist process using the first word problem on the Visually Representing Word Problems BLM. Have students read the problem and elicit answers to who, what, where, when, why, and how within the problem.

Name: _____ Date: _____

Visually Representing Word Problems

Word Problem One: Sarah and John worked at the ABC Pickle Packing Company. They work on the same shift and tonight, Sarah packed $\frac{4}{12}$ of the pickles using an automated machine. John packed $\frac{3}{12}$ of the pickles by hand. How many of the pickles did they pack together?

First Sentence: Sarah and John worked at the ABC Pickle Packing Company.

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

Second Sentence: They work on the same shift and tonight, Sarah packed $\frac{4}{12}$ of the pickles using an automated machine.

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

Third Sentence: John packed $\frac{3}{12}$ of the pickles by hand.

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

Bring their attention to the first sentence of the word problem (Sarah and John Worked at the ABC Pickle Packing Company) and using only the spaces allowed, write a statement in those spaces capturing the essential information of the sentence. All of the spaces do not need to be used initially. This is the beginning of the gist. Have students read the second sentence of the problem and use the information from the first and second sentence to rewrite the gist statement combining information from the first and second sentences. An example of the first gist is shown.

Visually Representing Word Problems Suggested Answers

Word Problem One: Sarah and John worked at the ABC Pickle Packing Company. They work on the same shift and tonight, Sarah packed $\frac{4}{12}$ of the pickles using an automated machine. John packed $\frac{3}{12}$ of the pickles by hand. How many of the pickles did they pack together?

First Sentence: Sarah and John worked at the ABC Pickle Packing Company.

Sarah	and	John	worked	at
the	pickle	company.	_____	_____

Second Sentence: They work on the same shift and tonight, Sarah packed $\frac{4}{12}$ of the pickles using an automated machine.

Sarah	picked	$\frac{4}{12}$	pickles	where
she	and	John	worked.	_____

Third Sentence: John packed $\frac{3}{12}$ of the pickles by hand.

Together	Sarah	and	John	picked
$\frac{4}{12}$	and	$\frac{3}{12}$	pickles.	_____

This process continues with the remaining sentences of the paragraph. As each sentence is read, the gist statement should be reworked to accommodate any new information without using more than the allotted number of spaces. Have students write their own summaries, or gist of the problem. Ask students to share theirs gists. Help students understand that the gist should be a statement that can be used to solve the problem.

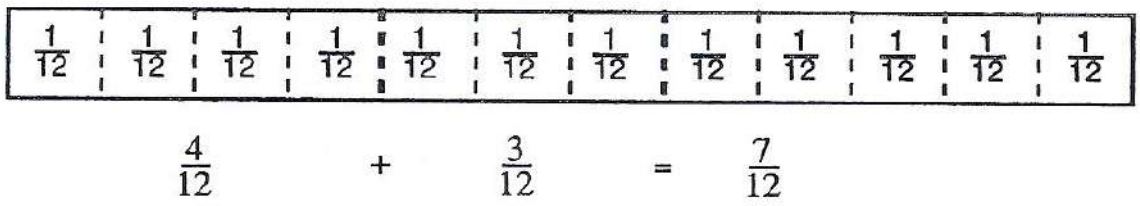
Have students work with partners to write gists about the second word problem. While they work, informally assess each student's process by walking around the room to observe students and offer assistance. Allow students to share their gists with the class and solicit comments and critique.

Tell students that they will work independently to create word problems for the remaining problems on their sheet. Have each student write word problems on his/her sheet and assist when needed. Tell students that the problems must be at least three sentences long and must match the fraction problems given. After the students have created word problems for each problem, allow them to switch their word problems with their partners. Instruct each pair to use *GISTing* to create a summary of their partner's word problems. In doing so, the student will understand how to find the important information in word problems that can be used to solve the problem. Allow students to share their *GISTing* experiences with the whole class.

Activity 10: From Words to Visual (GLE: 6; CCSS: 5.NF.2)

Materials List: Visually Representing Word Problems BLM (completed), Fraction Pieces BLM, pencils

Have students work in pairs. Allow students to use the Visually Representing Word Problems BLM previously completed in Activity 9 to visually represent the gist statement. They will use the statement and the visual created to answer the word problem. Have students use the Fraction Pieces BLM to create the visuals. Stress to the students that when adding fractions using fraction pieces strips, the strips must be folded to show only the fractions that are needed. The fraction pieces strips should be placed end to end. A longer strip must then be found which has fold lines in common with the two fractions like the example shown.



Discuss each problem in class, allowing students to display how they reached their answers to the class. Discussion should be generated about how common denominators are found.

2013-14
Activity 11: Mixed Numbers Practice (CCSS: 5.NF.1)

Materials List: paper, pencils, math learning logs

Display the problem $4\frac{2}{5}+2\frac{4}{5}$. Tell the student that in order to solve problems with mixed numbers, they may have to find equivalent fractions. Ask the students to look at the denominators to see if they can solve the problem as is. (Yes, the denominators are the same.) Have the students follow the process of working the problem as shown. Students may work the problem as displayed or horizontally. The students may also add the fractions first and then add the whole numbers or add the whole numbers first and then the fractions. 4 + 2 is 6 and $\frac{2}{5}+\frac{4}{5}$ is $\frac{6}{5}$.

$$\begin{array}{r} 4\frac{2}{5} \\ +2\frac{4}{5} \\ \hline 6\frac{6}{5} \end{array}$$

Have the students look at the fraction $\frac{6}{5}$. Ask the students if this fraction should be left as it is or if it needs to be renamed. Instruct the students to change the improper fraction $\frac{6}{5}$ to the mixed number $1\frac{1}{5}$. Ask the students what should be done with the 1 in $1\frac{1}{5}$. The students should respond that they should add the 1 to the 6 making the answer $7\frac{1}{5}$.

Display the problem $3 - 1\frac{1}{2}$. Ask the students what is the first step in solving this problem. (renaming the number 3 as $2\frac{2}{2}$) Have the students follow the process of working the problem as shown. Students may work the problem as displayed or horizontally.

$$\begin{array}{r} 3 = 2\frac{2}{2} \\ -1\frac{1}{2} = 1\frac{1}{2} \\ \hline 1\frac{1}{2} \end{array}$$

Display the problem $4\frac{2}{5} + 2\frac{1}{3}$. Remind students that in order to solve this problem, they may have to find equivalent fractions. Ask them to look at the denominators and if they can they solve the problem as is. The students should understand that the fractions must be renamed in order to have the same denominator. Assist the students in finding the least common denominator (15) by asking them questions to help them find the least common multiple such as "Is 3 a multiple of 5 or is 5 a multiple of 3?"and "What is the least common multiple between 3 and 5?" Remind the students of ways to find the least common denominator from Activity 6. Have the students follow the process of working the problem as shown. $\frac{2}{5}$ is equivalent to $\frac{6}{15}$ making the new mixed number $4\frac{6}{15}$. $\frac{1}{3}$ is equivalent to $\frac{5}{15}$ making the new mixed number $2\frac{5}{15}$. Adding $2\frac{5}{15}$ to $4\frac{6}{15}$ gives the answer $6\frac{11}{15}$.

$$\begin{array}{r} 4\frac{2}{5} = 4\frac{6}{15} \\ +\,2\frac{1}{3} = 2\frac{5}{15} \\ \hline 6\frac{11}{15} \end{array}$$

Give students problems such as $7\frac{1}{8}+4\frac{7}{12}\left(11\frac{17}{24}\right)$, $6\frac{1}{3}+3\frac{3}{4}\left(10\frac{1}{12}\right)$, $7\frac{5}{6}-2\frac{1}{4}\left(5\frac{7}{12}\right)$ to solve. Remind students that they should first rename the fractions to make denominators common: regroup if necessary during subtraction, and see if the answer can be simplified. Using math *learning logs* (view literacy strategy descriptions), have students write an explanation as to why they may need to regroup in some addition or subtraction questions, and explain how to do it using an example.

Activity 12: How Far Is It? (GLEs: 6, 9; CCSS: 5.NF.2)

Materials List: How Far Is It? BLM, paper, pencils, math learning logs

Make a transparency of the How Far Is It? BLM or give students copies of it. Give directions about the maps such as this: Take the shortest route, but stay on the path. Then ask, To find out how far the library is from Mark's house, should you add or subtract $\frac{7}{10}$ and $\frac{3}{10}$? To find out how much farther Kathy's house is from Mark's house than the library, what operation (s) should you use? To emphasize estimation, ask questions such as this: Do you think the distance from the school to Kathy's house is more or less than 1 mile?

Using math *learning logs* (view literacy strategy descriptions), have students write one addition, one subtraction, and one estimation question about Map B. Have students share their questions with the class.

Activity 13: Who Are We? (GLE: 9)

Materials List: Who Are We? BLM, pencils

Have students work in pairs. Provide one copy of the Who Are We? BLM to each pair of students. Students should find two different answers to fit each statement. Discuss each problem in class, listing all of the possible answers. Students do not have to use unlike denominators at any time. However, if students do use unlike denominators, discussion can follow about substituting an equivalent fraction so that they can add the fractions.

Activity 14: Number Lines (GLE: 4, 14)

Materials List: Number Lines BLM, paper, pencils

Give students the Number Lines BLM. Ask them to find a fraction such as $\frac{1}{4}$ on number line A. After locating $\frac{1}{4}$, ask them to name 3 fractions that would be greater than $\frac{1}{4}$. Write $x > \frac{1}{4}$ on the board. Show them how to draw $x > \frac{1}{4}$ on the first number line. Continue with different fractions and the other number lines, asking questions about greater than, greater than or equal to, less than, less than or equal to, and equal to. Each time, have students write the equation or inequality, and then graph it on the number lines.

Sample Assessments

General Assessments

- Portfolio assessments could include the following:
  - Anecdotal notes made during teacher observation
  - Any of the learning log entries, or one of the explanations from the specific activities
  - Corrections to any of the missed items on the tests
- On any teacher-made written tests, include at least one of the following.
  - One problem that requires the use of manipulatives or drawings, such as this: Using fractions, circles, or drawings, show why $\frac{1}{4}+\frac{3}{4}=1$.
  - One problem that requires the student to explain their reasoning, such as this: Why is the sum of $\frac{1}{4}+\frac{1}{4}=\frac{2}{4}$ and not $\frac{2}{8}$? Explain your reasoning.
  - One problem involving real-life, such as this: Describe a time in your life when it would be necessary to add and subtract fractions.
- Learning log entries could include the following:
  - Suppose two fractions are both less than 1. Can their sum be greater than 1? Can their sum be greater than 2? Explain your thoughts using an example.
  - Answer the following question. Look at the following sequence. $\frac{3}{8}, \frac{6}{16}, \frac{9}{24}, \frac{12}{32}\ldots$ What patterns do you see in the sequence? Explain how you could find the next fraction.

Activity-Specific Assessments

- Activity 7: Have students draw a number line and mark the following points on the line: 0, $\frac{3}{4}$, $1\frac{1}{2}$, $\frac{2}{2}$.

- Activity 9: Have students use *GISTing* to solve the following problem: Packing Patty made 12 gift baskets and sold them in packages. She sold 1 package and had $\frac{10}{12}$ of the baskets left. She sold another package and had $\frac{8}{12}$ of the packages left. How many baskets were in each package? How many packages were made? Explain.

- Activity 11: Have students solve the following addition and subtraction problems: $1\frac{1}{2}+4\frac{2}{4}\ (6)$, $2\frac{1}{2}+6\frac{5}{16}\ (8\frac{13}{16})$, $5\frac{8}{12}-2\frac{1}{6}\ (3\frac{1}{2})$, $10\frac{3}{4}-2\frac{9}{16}\ (8\frac{3}{16})$

- Activity 12: Using the How Far Is It? BLM, have students make up one addition and one subtraction word problem involving fractions, using Map A. Students should write the equation and solve the problem.