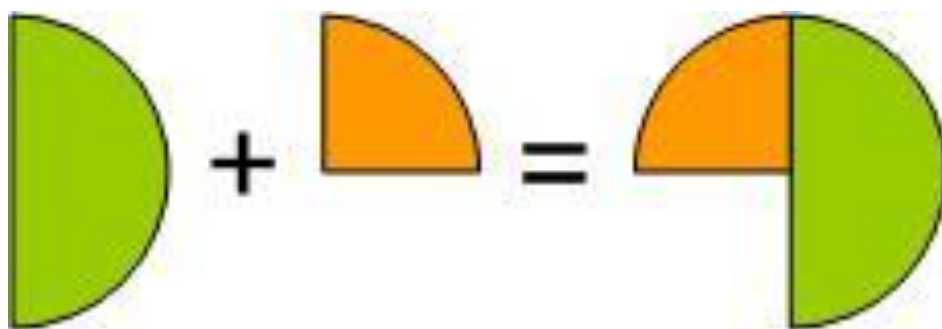


# Adding and Subtracting Fractions

Thematic Unit

May 10, 2017



$$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$

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### Unit Overview

This fifth grade unit over fractions teaches students how to add and subtract fractions and mixed numbers through games, songs, and other projects. The unit also requires students to apply this knowledge to solving word problems and then writing their own. The unit takes place over five days, during which students must pass a multiple choice quiz and then use a project menu to earn points toward their final grade. Every student will be given a different amount of points that they must attempt, including a minimum of one big final project, based on ability. During their free time to work on these projects, the teacher may pull out small groups for intervention and reteaching of the subject to help them also reach their goal. On the final day of the unit, students' time will be split between working on their final project and completing various math centers that will also be a part of their final assessment. Any work not completed after that day will be assigned as homework over the weekend and due on the next school day after the unit ends.

### Materials Needed

- Day 1 entrance ticket displayed on the board
- Day 1 entrance ticket answer key
- Accelerated Course worksheet
- Word problem worksheet
- 2 sided counters
- White boards
- Dry erase markers
- White board erasers
- Plastic cups
- Project menu and copies of each project rubric
- Day 1 exit ticket displayed on the board
- Day 1 exit ticket answer key
- Day 2 entrance ticket displayed on the board
- Day 2 entrance ticket answer key
- Guided Notes Page
- Guided Notes [Presentation](#)
- [Fractions song](#)
- Whiteboards and dry erase markers for each student
- Multiple connect four games adapted for practicing fractions (see attached instructions)
- Fraction connect four rule sheets
- Day 2 exit ticket displayed on the board
- Day 2 exit ticket answer key
- Day 3 welcome message displayed on the board
- Operating station for each group of students (foil roaster “patient”, body parts, medical supplies, etc.)
- Patient file for each student
- [Hospital sound effects](#)
- Patient file answer key for each level
- Day 3 exit ticket displayed on the board
- Day 3 exit ticket answer key
- Day 4 entrance ticket displayed on board
- Day 4 entrance ticket answer key
- Differentiated word problem worksheets
- Day 4 exit ticket displayed on board
- Day 4 exit ticket answer key
- Day 5 entrance ticket displayed on the board
- Day 5 entrance ticket answer key
- Station instruction sheets
- Folder for each student with station worksheets

- Trail mix ingredients (see station 1 instruction sheet)
- Various measuring cups
- Differentiated trail mix recording sheets
- Playing cards (face cards removed)
- Card game recording sheets
- Index cards labelled + or –
- Table with tape line across the middle
- Differentiated error analysis worksheets
- Error analysis answer key
- Centers rotation chart
- Timer with different sound effects
- Post-it notes

## Lesson 1

**Kayla Ross**

**March 22, 2017**

**Fifth Grade**

**Learning Goals/Objectives:** Students will learn the first step to adding and subtracting fractions by learning to create equivalent fractions with the same denominator.

**Common Core Standards:** 5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers and fractions greater than 1) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, use visual models and properties of operations to show  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ . In general,  $\frac{a}{b} + \frac{c}{d} = (\frac{a}{b} \times \frac{d}{d}) + (\frac{c}{d} \times \frac{b}{b}) = \frac{ad + bc}{bd}$ .

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. For example, recognize an incorrect result  $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ , by observing that  $\frac{3}{7} < \frac{1}{2}$ .

L.5.6 Acquire and use accurately grade appropriate general academic and domain specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

**Methods:** The teacher and students enter the room. The students take their seats and begin working on the entrance ticket that the teacher has displayed on the board. After five minutes, the teacher goes to the board and begins to go over the answers. “Welcome. Thank you for trying your best on this entrance ticket so that I can see what you already know. Everyone get out a colored pen so you can check your work. Remember, this is not for a grade, just to show what you know before I teach you, so don’t feel bad if you didn’t do well. Now who wants to try number one for us?” The teacher calls on a student to explain how they completed problem number one. If the student completed the problem correctly, the teacher says, “Very good, that is the correct answer.” If the student completed the problem incorrectly, the teacher says, “Thank you for sharing your thinking. Even though that’s not exactly right, you did a great job explaining yourself. Since I haven’t showed you how to do this yet, let me show you quickly how I would do this problem.” The teacher then does the problem correctly on the board and repeats this process with all of the problems on the entrance ticket.

If any students have answered all questions correctly, the teacher pulls them to a separate table and addresses them, “If you feel confident, you may move on to working on some problems by yourself. If not, you are still welcome to join the group for some extra practice.” For any

student choosing to work independently, the teacher gives them a practice sheet and a sheet of word problems. The teacher instructs these students to do the practice sheet first and then try a word problem.

The teacher addresses all of the students who are working with the group from the front of the room, “Today we are going to learn just the first step of adding and subtracting fractions when the denominators are different. So first, let’s review some problems that you should already know how to do.” The teacher writes  $\frac{4}{8} + \frac{2}{8} =$  on the board, “What are the denominators in this problem?” If students struggle with this question, the teacher says, “remember that the denominator is the number in the bottom half of the fraction.” The teacher calls on a student with their hand raised, who answers that the denominator is 8. “So, are the denominators the same?” The teacher calls on another student with their hand raised, who answers yes. “Will the denominator in our answer change or stay the same?” The teacher calls on a student who says that the denominator will stay the same. The teacher says, “Very good” and writes  $\frac{\quad}{8}$  after the equals sign in the equation on the board. “Now what are the numerators in this problem?” The teacher calls on a student with their hand raised, who answers that 4 and 2 are the numerators. “Very good,” the teacher says, “What do we do with our numerators in this problem?” The teacher calls on a student, who answers that they should be added, “Good, and what is our answer when we add them?” The teacher calls on a student with their hand raised, who answers 6. The teacher writes  $\frac{6}{8}$  in the equation on the board, “Very good, and that is how we add when the denominators are the same. Adding when the denominators aren’t the same isn’t all that different, we just have to add one extra step to get there. That step is what we’re going to practice today.”

The teacher writes  $\frac{1}{2} + \frac{1}{3} =$  on the board. “Before we can add these two fractions, we need to make their denominators the same. How might we do that?” The teacher calls on a few students to share their ideas. If no students are correct, the teacher explains, “We need to find a number that has both of the denominators as a factor. Remember that a factor is a number that can be multiplied together to get a bigger number. What is the easiest way to find a number that has both of these numbers as a factor?” The teacher calls on a student with their hand raised, who says that you can multiply the numbers together. “Very good,” the teacher says, “If we multiply 2 and 3, we will get a number that has both of the denominators as a factor for our new denominator. What should that new denominator be?” The teacher calls on a student who answers, “6”. “Correct,” the teacher says, “now here is where it gets a little tricky. We have changed the denominators, but we don’t want to change the meaning of the problem, so we have to change the numerators too, so that the fractions will still equal the same. To make equivalent fractions, we have to do the same thing to the top as we do to the bottom. So let’s start with  $\frac{1}{2}$ . What did we do to the bottom to change 2 to 6?” The teacher calls on a student who answers that we multiplied by 3. “Very good,” the teacher says, “We multiplied 2 by 3 because 2 times 3 equals 6. If we multiplied the bottom by 3, what do we need to do to the top to keep them equal?” The teacher calls on a student who says that you multiply by 3. “Correct. And when we multiply by 3, what is our new numerator?” The teacher calls on a student who answers with 3.

The teacher writes  $\frac{1}{2} = \frac{3}{6}$  on the board. “Why is this true?” The teacher asks the students. The teacher calls on several students to give their thoughts on why this is correct.

The teacher then calls 6 students to the front of the room, 3 boys and 3 girls. The teacher lines the students up in two lines facing one another, one line of boys and one line of girls. The teacher says, “Does everyone agree with me that 3 out of the 6 students up here are girls?” The class answers “yes” and the teacher writes  $\frac{3}{6}$  girls on the board. “Now what if I split these students into groups of 2?” The teacher pairs off one boy and one girl into each pair. “Do I still have 3 boys and 3 girls standing up here?” The teacher asks, and the class responds “yes”. The teacher asks “But how many out of each group of 2 are girls?” The class answers “1”. The teacher says, “Yes. So  $\frac{1}{2}$  of the students are girls. They’re still saying the same thing.” The teacher sends the students back to their seats and goes back to the problem on the board. “Now let’s look at  $\frac{1}{3}$  the other fraction in our problem. What did we multiply the denominator by in this fraction?” The teacher calls on a student who answers, “2”. “Good” the teacher responds, “So what do we need to multiply the numerator by to make an equivalent fraction?” The teacher calls on a student who answers “2”. “Good,” the teacher responds, “and what will our new numerator be?” The teacher calls on a student who answers, “2”. “Good,” the teacher responds, and writes  $\frac{1}{3} = \frac{2}{6}$  on the board. The teacher passes out 2 sided counters to each student, “show me with your counters why this equation is true, the same way that I showed you using students with the last one.” The teachers circles the room, looking at how the students have arranged their counters. The teacher asks, “Who would like to show everyone what you did?” and calls on a student with their hand raised. The student should show some arrangement of counters with 2 of one color and 4 of another, divided into groups of 3 with one counter of one color and 2 of another counter. After the student explains, the teacher says, “Who agrees with this answer?” and students raise their hands. Then the teacher asks, “Did anyone arrange their counters differently?” The teacher allows students to show different ways they may have arranged their counters to create the same fractions, letting the class vote on whether they agree or disagree with each response and explaining how to correct any wrong answers given.

The teacher says, “Sometimes there is also an easier factor to find. For example, if I had one half and on fourth instead of one third,” the teacher writes these two numbers on the board, “we could still multiply the denominators together. But what else could we do to make the denominators the same?” The teacher calls on a student who says that you can multiply the denominator by two and make it four. The teacher says, “Good thinking. This way we don’t have to multiply both fractions, just the one. If we multiplied the denominator of one half by two, what do we need to do to the numerator?” The teacher calls on a student who answers, “Multiply by two”. The teacher says, “Good. And what is our final fraction?” The teacher calls on a student who answers, “two fourths” and the teacher writes that number on the board. “There are many ways that we can make the denominators in fractions match. But always remember that if you can’t find another factor, you can multiply the denominators and get a factor no matter what.



The teacher gives each student a white board and marker. “Now it’s your turn to practice. Your starting fraction is  $\frac{2}{4}$ . I want your ending fraction to have a denominator of 20. Write your answer on your whiteboard and show me with your counters why that answer is correct.” While the students work, the teacher goes back to any students working independently and checks their work. The teacher also looks over what the other students are doing on their whiteboard. After 2 minutes, the teacher says, “Everybody hold up your whiteboard so I can see your answer.” The teacher looks at the whiteboards and makes note of who was correct and who was incorrect. Then the teacher asks a student who got the problem correct to explain how they got this answer to their peers. The student demonstrates their thinking on the board and the teacher asks, “Does everyone understand that?” and pauses for questions. Then the teacher says, “Now your fraction is  $\frac{3}{5}$  and I need you to make a fraction with a denominator of 40.” The teacher circles the room, looking at what the students are writing and how they are arranging their counters. After 2 minutes the teacher says, “Show me your whiteboards.” The students hold their whiteboards up and the teacher asks a student to demonstrate their answer on the board. Just as before, the teacher pauses to answer any questions. If most students are doing well, the teacher may choose to move on at this point. If most are struggling, the teacher repeats the process with additional fractions until most of the class is able to get the right answer.

When the teacher has decided to move on, the teacher addresses the class. “When I say go, I want everyone to get with a partner. Take your whiteboards, markers, and counters with you. You need to do this in 30 seconds or less because we have a game to play and I want to make sure we have time for it. Ready...go!” The students move to sit with a partner. After 30 seconds, or whenever the students are seated, the teacher begins passing a plastic cup to each pair. “I’m giving you all one cup. You will count out 12 counters into your cup that you and your partner will share. To play the game, shake the cup and dump it onto the table.” The teacher demonstrates with an already prepared cup from the front of the room. “Record the fraction of red counters on your whiteboard,” the teacher records the number on the board for all students to see. “Then come up with as many equivalent fractions as you can for that fraction. Your partner gets to check all of the fractions that you wrote to decide if they are correct or not, and you get one point for every fraction you get. If there is a disagreement and you can’t decide whether a fraction is equivalent or not, you can call on me to come check, but I want you to really use all of your resources to check it on your own first. Also, if you have any questions, I will be walking around the room to help you out. You may begin playing.”

The teacher goes to the students in the accelerated group who have been working ahead of the class. “You are going to do the same thing with your counters,” the teacher instructs them “but after you find the equivalent fractions, I want you to add them all together.” The teacher circles the room, watching students play the game and answering any questions or disputes that may arise.

15 minutes before class ends, the teacher announces, “you have five minutes left to play. Finish the round you are on and total up your scores.” When those five minutes are up, the teacher announces, “Times up, put your things away and go back to your regular seats.” The teacher puts a project menu on each desk. When all students are seated, the teacher says, “At

your desk, you have a project menu. The first thing that everyone has to do on the project menu is to take a multiple choice quiz. We already took one as our entrance ticket, and in a minute we're going to try another one. Don't be worried if you don't get it right away because we haven't even practiced all of the things that are on it yet. You will have plenty of chances to get it done. When you do get 100% on a multiple choice quiz, you will move on to doing word problems. After you have done your word problems, then we will set a point goal for you and it will be your responsibility to do enough activities to add up to your point goal. Even though you don't have a point goal yet, be looking over the menu and deciding what projects you would like to do. Every one of you will have to choose at least one of the big projects to do for your final grade. Now I need you to put everything away except for a piece of paper and complete your exit ticket. Remember, it won't be counted for a grade unless you get 100% on it, then you'll get to move on to other things." The teacher displays the exit ticket on the board and the students complete it on a separate sheet of paper. As the rest of the class works, the teacher meets with the accelerated students and looks at the independent work they have done during class. If they have shown understanding and have completed both regular and word problems correctly, the teacher sets a high point goal for them to complete on the project menu and tells them they can begin working on these items. If the students have not shown understanding, the teacher says, "you almost have it, but I think you need a little more practice. Go back to your seat and work on the exit ticket with everyone else so we can make sure that you have this down.

When class is over, the teacher says, "Thank you for working hard today. Tomorrow we will continue this lesson. Please hand me your exit ticket as you go out the door. See you tomorrow." The teacher stands at the door and collects exit tickets from each student as they go to their next destination. The teacher grades the exit tickets before the next class to see which students need review and which ones understand.

### **Materials/Resources:**

- Entrance ticket displayed on the board
- Entrance ticket answer key
- Accelerated Course worksheet
- Word problem worksheet
- 2 sided counters
- White boards
- Dry erase markers
- White board erasers
- Plastic cups
- Project menu and copies of each project rubric
- Exit ticket displayed on the board
- Exit ticket answer key

**Connection to Prior Knowledge:** Connects to the following standards:

4.NF.1 Explain why a fraction  $a/b$  is equivalent to a fraction  $(n \times a)/(n \times b)$  by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

4.NF.3 Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ .

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples:  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ .

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

L.4.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

#### **Assessment:**

**Before**-Entrance ticket

**During**-Class discussion, whiteboard practice, game

**After**-Exit ticket

#### **Special Needs of Students:**

**Enrichment**-Students who are ahead of the class complete an accelerated course, working ahead on projects and attempting more points on the project menu

**Intervention**-Students who are struggling will have a lower point goal to meet from the project menu.

**Reflection:** This lesson is appropriate for a fifth grader's physical development because it allows them the opportunity to move around and engage in hands-on activities to physically represent mathematical concepts. This lesson is appropriate for a fifth grader's cognitive development because it asks them to review the knowledge that they already have of fractions and apply that knowledge on a deeper level. This lesson is appropriate for a fifth grader's language development because it asks them to engage in group discussion, to communicate through writing, and to use grade-level academic vocabulary terms such as "numerator" and "denominator" appropriately. This lesson is appropriate for a fifth grader's social emotional development because it allows them to work individually, in a pair, and cooperatively with the whole class. This lesson is appropriate for a fifth grader's interests because it allows them to engage in the material and apply it to a competitive game rather than sitting and listening to a lecture or doing a worksheet.

The evaluation strategy of the multiple choice exit ticket and worksheets shows if the students can complete math problems as they would be presented on a standardized test. The evaluation strategy of the project menu shows if the students can apply the knowledge gained throughout the unit to real life situations.

The project menu used throughout this unit allows students to share what they know through various multiple intelligences. In this lesson, the students complete many math problems, which connects with the logical/mathematical intelligence. They also listen to explanations of how to do these problems, which connects with linguistic intelligence. Working together on problems connects with interpersonal intelligence, while working individually on the entrance/exit ticket connects with intrapersonal intelligence. Working with hands-on representations of problems and playing the game to represent the problems connects with bodily-kinesthetic intelligence.

Listening to the teacher and fellow students explain the steps to problems is good for auditory learners. Seeing the teacher write out each step to a problem and looking at representations of different fractions is good for visual learners. Moving counters around to create fractions is good for kinesthetic learners.

## Lesson 2

**Kayla Ross**

**April 5, 2017**

**Fifth Grade**

**Learning Goals/Objectives:** Students will learn to add and subtract fractions with unlike denominators by converting them to fractions of like denominators.

**Common Core Content Standards:** 5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers and fractions greater than 1) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, use visual models and properties of operations to show  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ . In general,  $\frac{a}{b} + \frac{c}{d} = (\frac{a}{b} \times \frac{d}{d}) + (\frac{c}{d} \times \frac{b}{b}) = (\frac{ad + bc}{bd})$ .

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. For example, recognize an incorrect result  $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ , by observing that  $\frac{3}{7} < \frac{1}{2}$ .

L.5.6 Acquire and use accurately grade appropriate general academic and domain specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

**Methods:** The teacher and students enter the room. The teacher displays the entrance ticket and students work on it as soon as they come in, like every day. After five minutes, the teacher says, “Welcome class. I know that this stuff is still very new to you, but I am excited for today because today is when we get to learn how to use what we know to solve this kind of problems. After today, you will have the tools that you need to solve problems with fractions in your sleep, you’ll be so good at them.” The teacher goes over the problems on the entrance ticket, choosing a student to share their thinking by asking, “Can you tell everyone what you did to solve this problem?” After the student shares, the teacher says, “What do we think, class? Did this person solve the problem correctly?” If the answer is yes, the teacher says, “And how do we know that?” If the answer is no, the teacher says, “What was correct about this student’s thinking?” and then asks, “What was incorrect about this person’s thinking?” and allows the class to give answers. If the class is unable to give correct responses to these questions, the teacher then explains, and says, “Don’t worry, you will be learning this later today.”

After the entrance ticket is finished, the teacher takes any students who answered every problem correctly and adds them to the accelerated group from the day before. The teacher says, "If you feel confident in doing this kind of problems, you can work on some by yourself. If you were working on these yesterday and I have told you that you can move on, pick something from the project menu and begin working toward your point goal. All of the rubrics to tell you what you need to do are on my back table. And remember, I will still be teaching up here, so I need you to be quiet and respectful of your peers and me, and if you need any help or don't feel ready, join the discussion with us and it might help you out."

The teacher turns attention back to the whole class, "So, to start let's review what we learned yesterday. You might remember from yesterday that we can change the denominators in fractions to make them easier to work with. Can you remind me how to do that? I want to change this fraction," the teacher writes  $\frac{7}{8}$  on the board, "And make it have thirty-two in the denominator. What is the first thing I need to do to get to that answer?" The teacher calls on a student who answers that you multiply the denominator by four. "Very good," the teacher says, and writes  $\frac{7}{8} * \frac{4}{4}$  "And then what do I need to do?" The teacher calls on a student who answers that you multiply the numerator by four. The teacher says, "Very good. And why do I have to do that?" The teacher writes  $\frac{7}{8} * \frac{4}{4}$  on the board and calls on a student who answers that you have to multiply the numerator and the denominator by the same number to make an equivalent fraction. The teacher says, "Very good. And what is our final answer?" The teacher calls on a student who answers " $\frac{28}{32}$ ," and the teacher records this answer on the board. "Great work, class. And we can do the same thing when we are adding two fractions."

The teacher passes out the guided notes page and instructs the students to follow along. For each box on the page that needs to be filled in, the teacher changes slides on the [presentation](#) so students can see exactly what they need to fill in. There is also space on the bottom of the page for students to complete the problems that the teacher goes over as examples. "If I want to add  $\frac{1}{2}$  and  $\frac{1}{4}$ , I need to make them have the same denominators." The teacher writes  $\frac{1}{2} + \frac{1}{4} =$  "What will our first step always be on a problem like this?" The teacher calls on a student who answers, "Multiply to make the denominators the same." The students fill in this box on the graphic organizer and the teacher says, "Does anyone remember from yesterday how I figure out what that denominator should be?" The teacher calls on a student who answers that you multiply the two denominators. The teacher says, "Yes, you can always multiply the denominators to get the same denominator. What is another way we could make the denominators the same?" The teacher calls on a student who answers that you can make the denominator in one half four by multiplying it by two." The teacher says, "Very good. Right now, we are going to practice all of our problems by multiplying the two denominators because that is a good way to remember that works for any problem. But when you do them by yourself, you can multiply by any number you want as long as you can make the two denominators the same when you do it." The teacher writes  $2*4=$  on the board, "What does that make our new denominator?" The teacher calls on a student, who answers "eight". The teacher writes 8 on the board and says, "Very good. Now we know that we need to make both of these fractions have a denominator of eight, so we can treat

them just like we did with the last problem we did. So let's start with one half. What do we multiply that denominator by to get eight?" The teacher writes  $\frac{1}{2} * \underline{\hspace{1cm}} = \frac{\hspace{1cm}}{8}$  on the board and calls on a student who answers "four". The teacher says, "Very good" and writes  $\frac{1}{2} * \frac{\hspace{1cm}}{4} = \frac{\hspace{1cm}}{8}$  on the board, "If we multiplied the denominator by four, what do we need to multiply the numerator by?" The teacher calls on a student who answers, "Four". The teacher says, "Very good. Remember that you always multiply the numerator and the denominator by the same number"

The students fill out this section of the guided notes page and the teacher writes  $\frac{1}{2} * \frac{4}{4} = \frac{\hspace{1cm}}{8}$  on the board. "And if we do this, what will our new numerator be?" The teacher calls on a student who answers, "Four". The teacher says, "Good," and writes  $\frac{1}{2} * \frac{4}{4} = \frac{4}{8}$  on the board. "Now we need to make the other fraction in our problem match." The teacher writes  $\frac{1}{4} * \underline{\hspace{1cm}} = \frac{\hspace{1cm}}{8}$  on the board. "What do we need to multiply the denominator by to get eight?" The teacher calls on a student who answers, "Two". The teacher says, "Right" and writes  $\frac{1}{4} * \frac{\hspace{1cm}}{2} = \frac{\hspace{1cm}}{8}$  on the board. "Now what do we need to multiply the numerator by?" The teacher calls on a student who answers "two". The teacher says, "Very good" and writes  $\frac{1}{4} * \frac{2}{2} = \frac{\hspace{1cm}}{8}$  on the board. The teacher says, "What will our new numerator be?" The teacher calls on a student who answers "two". The teacher says, "Nice job" and writes  $\frac{1}{4} * \frac{2}{2} = \frac{2}{8}$  on the board. "Now," the teacher says, "We have two fractions with the same denominator that we can add together." The teacher displays the next step and the students fill in the next box on the guided notes page. "Remind me again," the teacher says, "what are the two fractions that we need to add?" The teacher calls on two students, who answer "four eighths" and "two eighths". The teacher says, "Good" and writes  $\frac{4}{8} + \frac{2}{8} =$  on the board and asks, "When we add fractions, what do we do with the denominators?" The teacher calls on a student who answers that the denominators stay the same. The teacher says, "Good. So what will be the denominator of our answer?" The teacher calls on a student who answers "eight". The teacher says "Good job," and writes  $\frac{4}{8} + \frac{2}{8} = \frac{\hspace{1cm}}{8}$  on the board. "And what do we do with the numerators in this problem?" The teacher calls on a student who answers that you add the numerators. The teacher says, "Very good. So what is our new numerator?" The teacher calls on a student who answers, "Six". The teacher says, "Great work, class," and writes  $\frac{4}{8} + \frac{2}{8} = \frac{6}{8}$  on the board. "We can go back and plug this same answer into our original equation," the teacher says, and writes  $\frac{1}{2} + \frac{1}{4} = \frac{6}{8}$  on the board, displaying the last section of the graphic organizer for students to fill out on their guided notes page. "If you want to check your answer, look at the original problem. If we add one half and one fourth, should our answer be more or less than one half?" The teacher calls on a student who answers "more than one half". The teacher says, "Good. And is this answer more than one half?" The teacher calls on a student who answers that yes, the answer is more than one half.

The teacher says, "You guys did such a great job on that problem. I knew you could do it. If you are still having a little trouble remembering the steps, I have a song that can help us remember. Everybody watch the words on the screen because after I play it once, I am going to

play it again so we can sing along and really get these steps in our brains.” The teacher plays the [adding and subtracting fractions song](#) once through and then plays it again and sings along with the students.

When the song has played through twice, the teacher says, “Now that we have learned the steps, I want you to try a problem on your own. Everybody grab a whiteboard and a marker from the center of your table.” Then the teacher writes  $\frac{1}{3} + \frac{2}{5} =$  on the board. “I want you all to try this problem on your own now. Remember to use all the tools we just practiced and check your answer when you finish. You can also use the counters from the center of your table like we did yesterday if that helps you think. When you’re finished, hold up your whiteboard so I can see your work.” As students hold up their whiteboards, the teacher gives a simple yes or no to their answer. After checking everyone’s answer, the teacher says, “Now let’s go over that one. You have space on your notes page to work this problem out, so be sure that you write down the steps, especially if you didn’t get the answer right the first time.” The teacher pauses a few seconds for students to get their notes and pencils ready, “What did you multiply  $\frac{1}{3}$  by?” The teacher calls on a student who answers “ $\frac{5}{5}$ ”. “Good,” the teacher says, and writes  $\frac{1}{3} * \frac{5}{5} =$  “and what is your new fraction?” The teacher calls on a student who answers “ $\frac{5}{15}$ ”. The teacher says, “Good,” and writes  $\frac{1}{3} * \frac{5}{5} = \frac{5}{15}$  on the board. “And what did you multiply  $\frac{2}{5}$  by?” The teacher calls on a student, who answers “ $\frac{3}{3}$ ”. The teacher says, “Good” and writes  $\frac{2}{5} * \frac{3}{3} =$  on the board, “and what is your new fraction?” The teacher calls on a student who answers, “ $\frac{6}{15}$ ”. The teacher says “good” and writes  $\frac{2}{5} * \frac{3}{3} = \frac{6}{15}$  on the board. The teacher asks, “What two fractions do we add together?” and calls on two students who answer “five fifteenths” and “six fifteenths”. The teacher says, “Very good,” and writes  $\frac{5}{15} + \frac{6}{15} =$  on the board. The teacher says, “What is our new denominator?” and calls on a student who answers “fifteen”. The teacher says, “Very good” and writes  $\frac{5}{15} + \frac{6}{15} = \frac{\quad}{15}$  on the board. The teacher asks, “What is our new numerator?” and calls on a student who answers, “Eleven”. The teacher says, “Very good,” and writes  $\frac{5}{15} + \frac{6}{15} = \frac{11}{15}$  on the board. The teacher points to the original problem and says, “So what is one third plus two fifths?” The teacher calls on a student who answers, “eleven fifteenths.” The teacher says, “Very good” and writes  $\frac{1}{3} + \frac{2}{5} = \frac{11}{15}$  on the board, “If you got eleven fifteenths as your answer, give yourself a pat on the back because you did this problem correctly. If you didn’t, look back over what you did and see what you could have done differently. Does anyone have any questions about this one?” The teacher pauses for a minute to allow students to look over their work and ask any questions needed. The teacher says, “Give me a thumbs up if you feel like you can do this on your own, a thumbs down if you don’t understand at all, and a sideways thumb if you sort of get it.” The teacher scans the room. If all or most of the students have their thumbs up, the teacher moves on. If most thumbs are down, the teacher may repeat more examples in the same manner as these ones.



When the students appear confident and able to complete addition problems, the teacher says, “Now when we look at subtracting fractions, we’re going to do exactly the same thing, only when you get your fractions with like denominators, you subtract the numerators instead of adding them. So let’s try this one on your whiteboards.” The teacher writes  $\frac{3}{4} - \frac{1}{3}$  on the board. The students work out the problem and hold up their white boards when finished. The teacher scans each whiteboard to see who has answered correctly and who has answered incorrectly. When the teacher has seen every whiteboard, the teacher says, “What did you multiply three fourths by in this problem?” and calls on a student who answers “three over three”. The teacher says, “Good” and writes  $\frac{3}{4} * \frac{3}{3} =$  on the board. “What is your new denominator?” The teacher asks, and calls on a student, who answers, “twelve”. The teacher says, “correct” and writes  $\frac{3}{4} * \frac{3}{3} = \frac{9}{12}$  on the board. The teacher says, “What is your new numerator?” and calls on a student who answers, “Nine”. The teacher says, “Good” and writes,  $\frac{3}{4} * \frac{3}{3} = \frac{9}{12}$  on the board, “And what did you multiply one third by in this problem?” The teacher calls on a student, who answers, “four over four”. The teacher says, “Good” and writes  $\frac{1}{3} * \frac{4}{4} =$  on the board. The teacher asks, “What is your new denominator?” and calls on a student who answers, “Twelve”. The teacher says, “correct” and writes  $\frac{1}{3} * \frac{4}{4} = \frac{4}{12}$  on the board. The teacher asks, “What is your new numerator?” and calls on a student who answers, “Four”. The teacher says, “Correct” and writes  $\frac{1}{3} * \frac{4}{4} = \frac{4}{12}$  on the board. The teacher asks, “What two fractions are you subtracting now?” The teacher calls on two students who answer “nine twelfths” and “four twelfths” and writes  $\frac{9}{12} - \frac{4}{12} =$  on the board. The teacher asks, “What is your new denominator?” and calls on a student who answers, “Twelve”. The teacher says, “Good job” and writes  $\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$  on the board. The teacher asks, “What is your new numerator?” and calls on a student who answers “five”. The teacher says, “Good” and writes  $\frac{9}{12} - \frac{4}{12} = \frac{5}{12}$  on the board. The teacher looks back to the original equation and asks, “What is three fourths minus one third?” and calls on a student who answers, “five twelfths”. The teacher says, “Very good” and writes  $\frac{3}{4} - \frac{1}{3} = \frac{5}{12}$  on the board. The teacher says, “Show me thumbs up, thumbs down, or thumbs sideways to show how you feel about subtracting fractions.” The students hold up thumbs and the teacher scans what the students have said. If most students are still unsure, the teacher repeats the process with additional problems. If most students are confident, the teacher moves on to the next activity.

When the students have had sufficient practice with both adding and subtracting fractions, the teacher says, “Now for extra practice, we are going to play a game. I need you to pair up with the person sitting next to you and we will be playing fraction connect four. Raise your hand if you have ever played connect four.” Students raise their hands. The teacher says, “Fraction connect four is a little bit different. Each partner will have a different fraction to play with. The yellow pieces mean you add that fraction and the red pieces mean you subtract that fraction. Your goal is to get your fraction to add up to one before your partner does. You may also need to subtract some from your partner’s row to block them from getting to one. It might

help you to keep track of each move and what it adds up to. You also need a piece of paper to keep track of your score on. Each time you get a row to add up to one, you need to write down the entire equation to get a point. At the end, the partner with the most points wins. Be sure to look at the rules if you need reminders or tips for how to play.” The teacher gives each pair a connect four game that has been modified for fractions (see attached instructions) and a rule sheet and watches the teams play, stopping to ask guiding questions or settle disputes between teammates. For an added challenge for accelerated, the teacher may combine two groups so that they are adding and subtracting with four different denominators instead of two. The teacher may also choose to have students switch game boards occasionally so that they are working with different fractions.

About ten minutes before class ends, the teacher announces, “Time is up. Please tally your scores, then write your name on your scoresheet and your notes page, if you used one, and turn it in to me. If you still need to work on your multiple choice quiz, sit at your desk and work on that. If you need to meet with me to make a point goal, come to the back table. If you have already started working on your project menu, you have ten minutes left to work on whatever project you started today.” The teacher displays a multiple choice quiz on the board and meets with any students who need to set a point goal. As time allows, the teacher also checks up on students who have already begun their project menu. When the allotted class time is over, the teacher says, “Great work today, class. Turn in your quiz if you just took one and head to your next class. See you tomorrow!” The students turn in their work and go to their next destination.

### **Materials/Resources:**

- Entrance ticket displayed on the board
- Entrance ticket answer key
- Accelerated worksheet (from lesson plan 1)
- Word problems worksheet (from lesson plan 1)
- Rubrics for project menu projects (from lesson plan 1)
- Guided Notes Page
- Guided Notes [Presentation](#)
- [Fractions song](#)
- Whiteboards/markers
- Two sided counters
- Multiple connect four games adapted for practicing fractions (see attached instructions)
- Fraction connect four rule sheets
- Exit ticket displayed on the board
- Exit ticket answer key

**Connection to Prior Knowledge:** This lesson connects with the previous day’s lesson and with the following standards:

4.NF.1 Explain why a fraction  $a/b$  is equivalent to a fraction  $(n \times a)/(n \times b)$  by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

4.NF.3 Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ .

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples:  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ .

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

L.4.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

### **Assessment:**

**Before-**Entrance Ticket

**During-**Whiteboard practice, fraction connect 4

**After-**Exit Ticket

### **Special Needs of Students:**

**Enrichment-**Students who have already passed a multiple choice quiz will be allowed to work ahead on more advanced projects involving adding and subtracting fractions

**Intervention-**Students who are not able to pass a multiple choice quiz will continue to receive instruction and extra practice until they pass.

**Reflection:** This lesson is appropriate for a fifth grader's physical development because it allows them the opportunity to move around and engage in hands-on activities to physically represent mathematical concepts. This lesson is appropriate for a fifth grader's cognitive development because it asks them to review the knowledge that they already have of fractions and apply that knowledge on a deeper level. This lesson is appropriate for a fifth grader's language development because it asks them to engage in group discussion, to communicate through writing, and to use grade-level academic vocabulary terms such as "numerator" and "denominator" appropriately. This lesson is appropriate for a fifth grader's social emotional development because it allows them to work individually, in a pair, and cooperatively with the whole class. This lesson is appropriate for a fifth grader's interests because it allows them to engage in the material and apply it to a competitive game rather than sitting and listening to a lecture or doing a worksheet. This lesson is also appropriate for a fifth grader's interests because the students all have an opportunity to work at their own pace and choose their own projects on the project menu.

The evaluation strategy of the entrance and exit tickets allows the teacher to see if the students are able to complete these problems in a multiple choice context. The evaluation strategy of the class discussion, practicing on whiteboards, and playing the games allows the teacher to see if the students are able to complete the problems even if they are not able to demonstrate this knowledge in a multiple choice context.

The project menu used throughout this unit allows students to share what they know through various multiple intelligences. In this lesson, the students complete many math problems, which connects with the logical/mathematical intelligence. They also listen to explanations of how to do these problems, which connects with linguistic intelligence. Working together on problems and playing games with others connects with interpersonal intelligence, while working individually on the entrance/exit ticket connects with intrapersonal intelligence. Working with hands-on representations of problems and playing the game to represent the problems connects with bodily-kinesthetic intelligence.

Listening to the teacher and fellow students explain the steps to problems is good for auditory learners. Seeing the teacher write out each step to a problem is good for visual learners. Manipulating the connect four pieces to play the game is good for kinesthetic learners.

### Lesson Plan 3

**Kayla Ross**

**April 12, 2017**

**Fifth Grade**

**Learning Goals/Objectives:** Students will add and subtract fractions with unlike denominators with little to no assistance.

**Common Core Content Standards:** 5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers and fractions greater than 1) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, use visual models and properties of operations to show  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ . In general,  $\frac{a}{b} + \frac{c}{d} = (\frac{a}{b} \times \frac{d}{d}) + (\frac{c}{d} \times \frac{b}{b}) = (\frac{ad}{bd} + \frac{bc}{bd})$ .

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. For example, recognize an incorrect result  $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ , by observing that  $\frac{3}{7} < \frac{1}{2}$ .

L.5.6 Acquire and use accurately grade appropriate general academic and domain specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

**Methods:** Prior to class, the teacher sets up “operating stations” all around the room. (See photo examples [here](#)) Each operating station should have a “patient” (body created from aluminum roasting pans filled with preprinted paper “body parts” cut out of one of the three attached worksheets), a patient folder for each student, and props such as fake IV bags, tweezers, rubber gloves, surgical masks, nametags, and other medical gear. Groups (3-4 students per group) should be predetermined according to ability and the names on nametags or patient folders tell students where to go. Patient folders for higher level students will contain worksheet A. Patient folders for middle level students will contain worksheet B. Patient folders for lower level students will contain worksheet C. Additional differentiated worksheets can be created as needed.

As students enter the room, the teacher displays the welcome message and students work on the problem at the bottom. After five minutes, the teacher says, “I’m sure you have noticed

that things are a little different today. We are still working on adding and subtracting fractions though. So as a quick review, let's listen to the fractions song again." The teacher plays the fraction song and encourages students to sing along with the lyrics on the screen. As the students sing, the teacher goes around the room and looks at the answer they gave for the question that was on the board.

After the song is finished, the teacher says, "Class, today we have a very important job to do. We have some lives to save. The hospital got overcrowded, so they sent some of their patients here for surgery. In just a few minutes I am going to send you to your operating stations. Everyone at the station will have a patient file where you need to take notes so that your patient gets the proper care. Once you get to your station and get all scrubbed in for surgery, each doctor will take turns removing a piece from the patient's body with the tweezers. That doctor will complete the problem written on the body part, and all the other doctors will check to make sure they did it right. Make sure you did it right, your patient's life depends on it. After you are confident that you have the right answer, write that answer on your patient's chart on the correct body part. When you think you have all of the right answers, add the total of all your answers together-it might be easier to break this down into chunks. If your total number is correct, your patient lives. If your total is not correct, you get one chance to go back and do CPR, check all of your answers and come up with a new total. If your answers is still not right, your patient is in trouble. Does anyone have any questions?" The teacher pauses to answer any questions and then calls off the names of students who will be operating at each station, reminding each student to "scrub in", either at the sink or with a bottle of hand sanitizer placed at each table, before beginning. The teacher plays [hospital sound effects](#) quietly in the background for effect and circles the room, watching students work. Students take a couple of minutes to "scrub in" and try on gloves and other props, then begin working on their "patient".

When a group finishes their work and calls the teacher over, the teacher makes a big deal out of checking on the patient. If the final number is correct, the teacher says, "Great job, doctors! Your patient is safe and should be able to go home in a few days." If the answer is incorrect, the teacher says, "Oh no doctors! Your patient is not doing so well. You'd better act fast and find out what went wrong so you can save his life." When students are finished with a correct answer, they may go back to their desks and work on their project menu activities. If students do not reach a correct answer after their second try, the teacher says, "You doctors put up a good fight, but your patient didn't make it. Let's take a look and try to find out what went wrong." The teacher goes to that group's operating station and goes over their paper with them to find out which ones they answered incorrectly.

If there are any groups still operating when ten minutes remain in the class, the teacher announces, "Our doctors only have five minutes left to save their patients. Please hurry." The students finish up their last problems and the teacher checks their work. When only five minutes remain in class, the teacher says, "That's all the time we have to operate. Please turn in what you have done and I'll see if your patient makes it or not. Everyone please go to your desks and complete the exit ticket on the board." The teacher displays the exit ticket on the board for the students to complete and finishes checking any work the students have just turned in.

When the class time is over, the teacher announces, “I am so proud of the work you all did today. You made such good doctors, and the hospital thanks you for your help.” If all of the patients “survived”, the teacher makes an extra big deal out of this. “I need all of my doctors to turn in your exit ticket so I can add it to your patient’s file. I’ll see you all tomorrow!”

### Materials:

- Welcome message displayed on the board
- [Adding and Subtracting Fractions Song](#)
- Operating station for each group of students (foil roaster “patient”, body parts, medical supplies, etc.)
- Patient file for each student
- [Hospital sound effects](#)
- Patient file answer key for each level
- Copies of each project menu rubric
- Exit ticket displayed on the board
- Exit ticket answer key

**Connection to Prior Knowledge:** This lesson connects with the previous day’s lesson and with the following standards:

4.NF.1 Explain why a fraction  $a/b$  is equivalent to a fraction  $(n \times a)/(n \times b)$  by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

4.NF.3 Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ .

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples:  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ .

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

L.4.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

### **Assessment:**

**Before**-Opening problem

**During**-Patient files

**After**-Exit ticket

### **Special Needs of Students:**

**Enrichment**-Groups will be organized by ability and given work that is on their level. Students who finish early will work on their project menu choices.

**Intervention**-Groups will be organized by ability and given work that is on their level.

**Reflection:** This lesson is appropriate for a fifth grader's physical development because it allows them the opportunity to move around and engage in hands-on activities to physically represent mathematical concepts. This lesson is appropriate for a fifth grader's cognitive development because it asks them to review the knowledge that they already have of fractions and apply that knowledge on a deeper level. This lesson is appropriate for a fifth grader's language development because it asks them to engage in group discussion, to communicate through writing, and to use grade-level academic vocabulary terms such as "numerator" and "denominator" appropriately. This lesson is appropriate for a fifth grader's social emotional development because it allows them to work individually and in small groups of students. This lesson is appropriate for a fifth grader's interests because it allows them to engage in the material and apply it to a hands-on activity rather than sitting and listening to a lecture or doing a worksheet. This lesson is also appropriate for a fifth grader's interests because the students all have an opportunity to work at their own pace and choose their own projects on the project menu, as well as to engage in fun hands-on activities.

The evaluation strategy of the entrance problem, as well as information already gathered in the previous lessons provides a baseline of how well students are able to complete problems on their own. The evaluation strategy of answering questions during the activity shows how well students perform on problems while working them out in groups. The evaluation strategy of the exit ticket shows how well students are able to complete problems after practicing with others and whether they have improved or not.



The project menu used throughout this unit allows students to share what they know through various multiple intelligences. In this lesson, the students complete many math problems, which connects with the logical/mathematical intelligence. Working together on problems and completing the operation activity with others connects with interpersonal intelligence, while working individually on the entrance/exit ticket connects with intrapersonal intelligence. Putting the body pieces together to solve problems connects with spatial and bodily/kinesthetic intelligences. Listening to and singing along with the song connects with musical intelligence.

Listening to the songs and the discussion of their group is good for auditory learners. Seeing the problems written out and represented on the body is good for visual learners. Moving pieces around to complete the operation activity is good for kinesthetic learners.

## Lesson 4

**Kayla Ross**

**April 19, 2017**

**Fifth Grade**

**Learning Goals/Objectives:** Students will apply their knowledge of adding and subtracting fractions to solve word problems.

Students will write and solve their own word problems to add and subtract fractions.

**Common Core Content Standards:** 5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers and fractions greater than 1) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, use visual models and properties of operations to show  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ . In general,  $\frac{a}{b} + \frac{c}{d} = (\frac{a}{b} \times \frac{d}{d}) + (\frac{c}{d} \times \frac{b}{b}) = (\frac{ad + bc}{bd})$ .

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. For example, recognize an incorrect result  $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ , by observing that  $\frac{3}{7} < \frac{1}{2}$ .

L.5.6 Acquire and use accurately grade appropriate general academic and domain specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

**Methods:** Students and teacher enter the room. The teacher displays the entrance ticket on the board and the students work for about five minutes. Then the teacher goes to the board. “Okay, class. You all have been doing an awesome job adding and subtracting fractions. But today is the day when I really want to see you use that knowledge to solve some real life problems. Adding and subtracting fractions is a skill you will use a lot. For example, when I go home and make myself dinner, I have to measure ingredients in fractions and add or subtract ingredients based on what I have in my cupboard. We use word problems to practice adding and subtracting in these real life situations. So let’s take a look at this word problem.” The teacher reads the problem from the board. “What is this problem asking us to do?” The teacher calls on a student who answers, “Add”. The teacher writes  $\underline{\quad} + \underline{\quad} = \underline{\quad}$  on the board and asks, “What words in the problem tell us that we need to add and not subtract?” The teacher calls on several students who

answer with words like “added another”, and “how much sugar in all” and the teacher underlines these words in the problem. “Good,” the teacher says, “What is the first amount that we add to our batter?” The teacher calls on a student who answers, “one half”. The teacher writes  $\frac{1}{2} + \underline{\hspace{1cm}} = \underline{\hspace{1cm}}$  on the board and asks, “What amount are we adding to this?” The teacher calls on a student who answers, “one third”. The teacher writes  $\frac{1}{2} + \frac{1}{3} = \underline{\hspace{1cm}}$  on the board and asks, “now what do we need to do to these two fractions to add them?” The teacher calls on a student who answers, “Make the denominators the same”. The teacher asks, “What should our new denominator be?” and calls on a student who answers, “Six”. The teacher writes  $\frac{1}{6} + \frac{1}{6} = \underline{\hspace{1cm}}$  on the board and asks, “What is the new numerator for one half?” The teacher calls on a student who answers, “Three” and writes  $\frac{3}{6} + \frac{1}{6} = \underline{\hspace{1cm}}$  on the board. The teacher asks, “What is the new numerator for one third?” and calls on a student who answers, “Two”. The teacher writes  $\frac{3}{6} + \frac{2}{6} = \underline{\hspace{1cm}}$  on the board and asks, “What is the denominator of our answer?” The teacher calls on a student who answers, “Six” and writes  $\frac{3}{6} + \frac{2}{6} = \frac{\hspace{1cm}}{6}$  on the board. The teacher asks, “What is the numerator of our answer?” and calls on a student who answer, “Five”. The teacher writes  $\frac{3}{6} + \frac{2}{6} = \frac{5}{6}$  on the board and says, “Now since this is a word problem and we have units, what should our final answer be?” The teacher calls on a student who answers, “five sixths cups” and writes,  $\frac{5}{6}$  cups on the board. The teacher says, “Great job everyone. Give me a big thumbs up if you got five sixths cups as your final answer.” The teacher scans to see whose thumb is up. If many students are still struggling, the teacher may repeat this process with additional word problems. If most students have their thumbs up, the teacher moves on to the next activity.

The teacher says to the students, “Now I need everyone to get a whiteboard and marker from the middle of the table. I want you to think hard and write your own addition word problem. Once you have your problem written, raise your hand and look around the room for somebody else with their hand raised. Pair up with that person, trade boards, and solve each other’s problems. Then you can trade back and grade your partner’s work. While you work on that, I am going to play our song again for anyone who needs a little reminder of how to solve these problems.” The teacher plays the adding and subtracting fractions [song](#) while the students write and move around the room. After about five minutes, the teacher asks, “Who still hasn’t traded problems with a partner yet?” Students raise their hands and the teacher allows additional time for those who haven’t. If many students are not finished, the teacher may ask the few who are to write an additional problem and trade with another partner. When everyone has solved a partner’s problem, the teacher says, “Now I want you to all write a subtraction word problem. You have to trade with somebody different this time. Try to at least be with a partner by the time the song is over.” The teacher plays the song again while students work and move around the room. When the song is over, the teacher says, “Who hasn’t traded with a partner yet?” The teacher allows students time to trade and solve the problems as needed.

When all students have traded, the teacher says, “Great job everyone. Solving word problems isn’t that hard, you just have to know what you’re looking for. Word problems are just

a way of telling a story with numbers. Finding the answer just makes another part of the story unfold. For example, in our entrance ticket, I now know that there are five sixths cups of sugar in Mary's cookie batter. If another part of my story tells me that the recipe only called for three fourths cups, I can figure out whether Mary has too much, too little, or just enough. Let's do that problem right now, on your whiteboard, and hold up your answer when you have one." The teacher watches the answers the students hold up and then says, "What is this problem asking us to do?" The teacher calls on a student, who answers, "compare". The teacher says, "Yes," we need to compare these two fractions and find out which one is bigger. What is the first thing we need to do to compare these two fractions?" The teacher calls on a student who answers, "Make the denominators the same". The teacher says, "Yes. And what do we want our new denominator to be?" The teacher calls on a student who answers, "twenty-four". The teacher says, "What do we need to multiply five sixths by to make the denominator twenty-four?" and calls on a student who answers "four over four". The teacher writes  $\frac{5}{6} * \frac{4}{4} = \underline{\hspace{1cm}}$  on the board and asks, "What is our new fraction?" The teacher calls on a student who answers "twenty over twenty-four" and writes  $\frac{5}{6} * \frac{4}{4} = \frac{20}{24}$  on the board. The teacher asks, "What should we multiply three fourths by?" and calls on a student who answers, "Six over six". The teacher writes  $\frac{3}{4} * \frac{6}{6} = \underline{\hspace{1cm}}$  on the board and asks, "What is our new fraction?" The teacher calls on a student who answers, "eighteen over twenty-four" and writes  $\frac{3}{4} * \frac{6}{6} = \frac{18}{24}$  on the board. The teacher asks, "Which fraction is bigger?" and calls on a student who answers, "twenty over twenty-four". The teacher asks, "So does Mary have too much or too little sugar?" and calls on a student who answers, "Too much". The teacher asks, "How much extra does she have?" and calls on a student who answers, " $\frac{2}{24}$  Cups". The teacher says, "Great job, guys. This is only some of the information that we can get from using our knowledge of fractions in real life. Because I want you to be extra prepared, I want you to have a little bit more practice with word problems like this. I'm going to give you a page with several word problems on it. I want you to start by picking one and doing it. When you have finished that one, raise your hand and I will come check it. If you have done it right, I will mark it and you can move on to another one. If not, I will show you where you had a problem and then you will move on to the next one. After I have marked two of your problems correct, you may work on your project menu projects. Don't forget that those will be due soon, and you have to at least attempt the amount of points that we set as your goal to pass. If you have any questions, raise your hand and I will come help you out."

The teacher passes out the differentiated word problem worksheets, giving worksheet A to the lower level students, worksheet B to the middle level students, and worksheet C to the higher level students. The students work on their word problems and the teacher moves around the room, checking each problem and helping students who need it. If it comes to just a few students still struggling while everyone else works on their projects, the teacher pulls these students over to a table and goes over the problems again as a small group until these students are able to complete their word problems.

When ten minutes remain in class, the teacher says, "You have five minutes left, so begin cleaning up what you were working on so you can come and do your exit ticket." The students

begin putting away supplies and the teacher displays the exit ticket on the board for students to complete.

When five minutes remain in class, the teacher says, “I need everyone in their seats doing the exit ticket now.” The students finish putting away any supplies still out and go to their seats to complete the exit ticket. When class time is over, the teacher says, “I’m so proud of how hard you guys have been working. Tomorrow you will get a chance to show what you know by completing several different problems, and I already know you’re going to do great.” The teacher collects the exit ticket at the door as students leave the room and go to their next destination.

### **Materials:**

- Entrance ticket displayed on board
- Whiteboards for each student
- Dry erase markers for each student
- Differentiated word problem worksheets
- Project menu rubrics
- Exit ticket displayed on board

**Connection to Prior Knowledge:** This lesson connects with the previous day’s lesson and with the following standards:

4.NF.1 Explain why a fraction  $a/b$  is equivalent to a fraction  $(n \times a)/(n \times b)$  by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

4.NF.3 Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ .

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples:  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ .

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

L.4.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

### **Assessment:**

**Before**-Entrance ticket

**During**-Whiteboard practice, worksheet

**After**-Exit ticket

### **Special Needs of Students:**

**Enrichment**-Students who need an extra challenge will be given higher level, multistep word problems to complete. When working on their project menu, these students must attempt a higher level of points.

**Intervention**-Students who are struggling will be given simpler word problems to complete and will receive small group instruction with the teacher to complete these problems if needed. When working on their project menu, these students will have a lower amount of points they must attempt.

**Reflection:** This lesson is appropriate for a fifth grader's physical development because it allows them the opportunity to move around and engage in different activities. This lesson is appropriate for a fifth grader's cognitive development because it asks them to review the knowledge that they already have of fractions and apply that knowledge to solving word problems. This lesson is appropriate for a fifth grader's language development because it asks them to engage in group discussion, to communicate through writing, and to use grade-level academic vocabulary terms such as "numerator" and "denominator" appropriately. This lesson is appropriate for a fifth grader's social emotional development because it allows them to work individually, in a pair, and cooperatively with the whole class. This lesson is appropriate for a fifth grader's interests because it allows them to engage in the material with friends and to work on different projects of their own interest once they have proved their abilities.

The evaluation strategy of the entrance and exit tickets allows the teacher to see if the students are able to complete word problems involving adding and subtracting fractions. The evaluation

strategy of the whiteboard practice allows the teacher to see if students can come up with their own problems and evaluate another student's answers. Asking the students to complete some problems on a worksheet before moving on shows the teacher that the students are able to solve problems as they would be presented on a test, while the project menu projects allow students to show that they can solve problems using other tasks.

The project menu used throughout this unit allows students to share what they know through various multiple intelligences. In this lesson, the students complete many math problems, which connects with the logical/mathematical intelligence. They also listen to explanations of how to do these problems and interact with word problems, which connects with linguistic intelligence. Working together on problems connects with interpersonal intelligence, while working individually on the entrance/exit ticket connects with intrapersonal intelligence. Moving around to find partners and work on new projects connects with bodily/kinesthetic intelligence. Practicing the adding and subtracting fractions song connects with musical intelligence.

Listening to the teacher and fellow students explain the steps to problems is good for auditory learners. Seeing the teacher write out each step to a problem is good for visual learners. Moving around and working on different projects is good for kinesthetic learners.

## Lesson 5

**Kayla Ross**

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**Fifth Grade**

**Learning Goals/Objectives:** Students will demonstrate understanding of adding and subtracting fractions in different types of problems.

**Common Core Content Standards:** 5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers and fractions greater than 1) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, use visual models and properties of operations to show  $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$ . In general,  $\frac{a}{b} + \frac{c}{d} = (\frac{a}{b} \times \frac{d}{d}) + (\frac{c}{d} \times \frac{b}{b}) = (\frac{ad + bc}{bd})$ .

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. For example, recognize an incorrect result  $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ , by observing that  $\frac{3}{7} < \frac{1}{2}$ .

L.5.6 Acquire and use accurately grade appropriate general academic and domain specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., however, although, nevertheless, similarly, moreover, in addition).

**Methods:** The teacher displays the entrance ticket on the board as students enter the room, take their seats, and work on the problems. After five minutes, the teacher says, “We have a lot to get through today, so instead of going through every problem, are there any that you were unsure of or any questions you have about these problems?” The teacher answers any questions that might be asked and then collects the students’ entrance tickets so they can be checked.

The teacher says, “Today, we have several stations around the room for you to complete. I am going to briefly go over them before we start, but you will also have an instruction sheet at each station in case you forget.” The teacher moves to station one and says, “at this station you will be making a yummy treat: trail mix. As you can see, we have many different ingredients. Each ingredient is measured with a different cup. Your job is to make your own trail mix from the ingredients we have and then add up how much you have in your bag.” The teacher moves to station two and says, “At this station you will be playing a fractions card game. Your cards will



be separated into four piles. When one person says go, four of your team members will each turn over a card. The two top piles go on top of the line and the two bottom piles go under the line, so you have two fractions. The fifth person will turn over an operation card, so you know whether to add or subtract the two fractions. The first person to complete the problem gets a point.” The teacher moves to station number three and says, “At this station you will be the teacher and grade these problems that other students have done. Decide if they did the problem correctly or incorrectly, and explain why. If they are incorrect, give the correct answer.” The teacher moves to station four and says, “This is your catch-up station. When you come here, the first thing you will do is finish anything that you have not completed from the other stations. Which means that if you are at this station first, you won’t have a lot of time to catch up so you really need to try and get everything done at the station. If you have everything finished from the other stations, or if you are in the first group and don’t have anything to catch up on yet, work on your projects from your project menu. Don’t forget that today is the last day we will work on those project menus in class and everything will be due on Monday, so anything you don’t finish today will become homework over the weekend. If you are completely finished with everything, you can get on the computer and play the fraction games that I have for you, but you better have everything done first. I will be coming over to this station regularly to make sure everyone is working.” The teacher gives each student a folder. The folders are already filled with whatever worksheets the students need to complete at their stations, differentiated based on needs (station two is the same for everyone), “Everything that you do at your stations needs to go in this folder so it can all be turned into me at the end of class. If it is not in your folder, then I have to assume you didn’t do it and you will not get credit for it.” The teacher displays the centers rotation chart on the board, along with the list of names of students in each group. “When I say go,” the teacher says, “move to your first center. When you hear this sound,” the teacher plays a sound effect, “that means you have two minutes left so be finishing up whatever you’re working on. When you hear this sound,” the teacher plays a sound effect, “That means it is time to move to your next center.” The teacher sets the timer so that the first sound effect plays after thirteen minutes and the second sound effect plays after fifteen minutes, and then says, “Go to your first center.”

If a parent volunteer or paraprofessional is available in the classroom, the teacher has this adult supervise the trail mix station. If not, the teacher moves back and forth between this station and the catch-up station to make sure students are still working.

Every fifteen minutes, students rotate stations and complete the work at each station. After each group has been to every station and the timer goes off, the teacher instructs the students, “Turn in your folders on my table and go back to your desks now,” the teacher distributes a post-it note to each desk, “at your desk you will find a post-it note. Write on your post-it one important thing that you have learned this week about adding and subtracting fractions and sign your name. When you leave, stick your post-it to the outside of the door so everyone walking in the hall can see what you have been learning this week.” If students complete this task quickly and time allows, the teacher calls on students to share what they wrote on the post-its. When it is time for the class to leave, the teacher dismisses the students to their next destination and they leave their post-its stuck to the door.

**Materials/Resources:**

- Entrance ticket displayed on the board
- Entrance ticket answer key
- Station instruction sheets
- Student folders with all station worksheets
- Trail mix ingredients (see station 1 instruction sheet)
- Various measuring cups
- Differentiated trail mix recording sheets
- Playing cards (face cards removed)
- Card game recording sheet
- Index cards labelled + or –
- Table with tape line across the middle
- Differentiated error analysis worksheets
- Error analysis answer key
- Project menus and rubrics for all projects
- Centers rotation chart
- Timer with different sound effects
- Post-it notes

**Connection to Prior Knowledge:** This lesson connects with the previous day's lesson and with the following standards:

4.NF.1 Explain why a fraction  $a/b$  is equivalent to a fraction  $(n \times a)/(n \times b)$  by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

4.NF.3 Understand a fraction  $a/b$  with  $a > 1$  as a sum of fractions  $1/b$ .

a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.

b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples:  $3/8 = 1/8 + 1/8 + 1/8$ ;  $3/8 = 1/8 + 2/8$ ;  $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ .

c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

L.4.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).

### **Assessment:**

**Before**-Entrance ticket

**During**-Observations of work completed in stations

**After**-Collected work from stations, post-it note, project menu work

### **Special Needs of Students:**

**Enrichment**-Students who need an extra challenge will receive a differentiated folder of tasks to complete at each station. These students will also be working toward a higher amount of points on the project menu.

**Intervention**-Students who need extra help will be given a differentiated folder of tasks to complete at each station. These students will be the last to go to the catch-up station, as they are the most likely to need time to finish. If needed, the teacher will be able to help them complete work from previous stations when they come to this one. Students in this group will be working toward a lower amount of points on the project menu.

**Reflection:** This lesson is appropriate for a fifth grader's physical development because it allows them the opportunity to move around and engage in different activities at each station. This lesson is appropriate for a fifth grader's cognitive development because it asks them to use what they have been learning all week and apply that knowledge to different tasks. This lesson is appropriate for a fifth grader's language development because it asks them to engage in group discussion, to communicate through writing, and to use grade-level academic vocabulary terms such as "numerator" and "denominator" appropriately. This lesson is appropriate for a fifth grader's social emotional development because it requires them to work cooperatively with a group of peers, and also to do some work individually. This lesson is appropriate for a fifth grader's interests because it allows them to engage in the material in many different ways and to choose some projects that interest them.

The evaluation strategy of the entrance ticket provides a baseline of what the students are able to do when it comes to adding and subtracting fractions. The evaluation strategy of the work completed at different stations allows the teacher to see how the students can apply their knowledge in different real life situations and higher thinking situations, such as analyzing another's error. The project menu also allows students to show their knowledge in the form that they are most comfortable with. Asking students to write what they have learned on the post-it notes provides another insight to how well the students understand the concept and whether they are able to articulate that understanding in words.

The project menu used throughout this unit allows students to share what they know through various multiple intelligences. In this lesson, the students complete many math problems, which connects with the logical/mathematical intelligence. They also must talk some problems out with their group, which connects with linguistic and interpersonal intelligence. Working individually on the entrance ticket and the post-it note exit ticket connects with intrapersonal intelligence. Moving around to different stations and completing activities like measuring ingredients and playing games connects with bodily/kinesthetic intelligence.

Listening to other students explain the steps to problems as they work together in groups is good for auditory learners. Seeing the problems and writing out solutions to these problems is good for visual learners. Moving around and working on different projects and manipulating things like measuring cups and game cards is good for kinesthetic learners.

Point value	Activity				
5	Score 100% on the multiple choice quiz	Answer 2 word problems correctly by yourself	Complete a target number chart with a given fraction as your target number	Draw a picture to represent 2 fraction problems given to you by your teacher.	Find all of the common multiples of 2 numbers given by your teacher. Explain how you would use this information to add and subtract fractions
10	Write a five question quiz over adding and subtracting fractions with an answer key.	Create a poster that uses examples to demonstrate the steps to adding and subtracting fractions	Make a recipe doubled by adding to the amount in the original recipe. Write the new recipe (bonus points if you bring samples to class)	Write a word problem story that uses both addition and subtraction of fractions.	Design a pizza that will be shared by at least 4 friends who all eat different amounts and want different toppings on their share.
15	Write and illustrate a picture book or comic book that teaches the steps to adding and subtracting fractions.	Write a song or rap that teaches how to add and subtract fractions.	Design a game that teaches how to add or subtract fractions.	Create a PowerPoint and a guided notes page that could be used to teach students how to add and subtract fractions.	Make a video about adding and subtracting fractions

### Final Project Menu

Everyone must complete the multiple choice test, 2 word problems, and at least one 15 point activity. Total point values required will be given to each student.

## Multiple Choice Quiz

1.  $\frac{1}{2} + \frac{2}{3} =$

A.  $\frac{3}{5}$

B.  $\frac{7}{6}$

C.  $\frac{7}{5}$

D.  $\frac{3}{6}$

2. What is the simplest form of  $\frac{25}{200}$ ?

A.  $\frac{1}{4}$

B.  $\frac{1}{6}$

C.  $\frac{1}{8}$

D. This fraction is already in simplest form

3.  $\frac{4}{5} - \frac{1}{3} =$

A.  $\frac{7}{10}$

B.  $\frac{7}{15}$

C.  $\frac{3}{5}$

D.  $\frac{3}{2}$

4. Which fraction is NOT equivalent to  $\frac{2}{5}$ ?

A.  $\frac{5}{10}$

B.  $\frac{10}{25}$

C.  $\frac{20}{50}$

D.  $\frac{40}{100}$

5.  $\frac{1}{3} + \frac{5}{6} - \frac{2}{9} =$

A.  $\frac{7}{8}$

B.  $\frac{7}{18}$

C.  $\frac{17}{18}$

D.  $\frac{4}{18}$

## Quiz Answer Key

1. B
2. C
3. B
4. A
5. C



## Word Problems

For each problem, show your work and explain how you got this answer.

1. You have  $\frac{3}{8}$  of a pepperoni pizza in one box and  $\frac{1}{4}$  of a cheese pizza in another box. How much pizza do you have in all?

2. A pitcher contains  $2\frac{3}{4}$  pints of orange juice. After you pour  $\frac{5}{8}$  pint into a glass, how much juice is left in the pitcher?

## Word Problem Answer Key

1.  $\frac{1}{4} * \frac{2}{2} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$  of one pizza

2.  $2\frac{3}{4} = \frac{11}{4} * \frac{2}{2} = \frac{22}{8} - \frac{5}{8} = \frac{17}{8} = 2\frac{1}{8}$  pints left in the pitcher

\*Methods used to find these answers could be traditional equations, pictures, words, or any combination of these.

# Target Number Work Mat

Equation #1:

Equation #2:

Target Number:

\_\_\_\_\_

Equation #3:

Equation #4:

### Picture

You must draw two different pictures to demonstrate fraction problems. Your pictures can use any objects you want, as long as they show what it looks like when you add or subtract the given fractions. Your pictures should be colorful and neat.

Points:

Two different fraction problems are drawn.....2 pts

Both the problem and answer are accurately drawn.....2 pts

Pictures are neat and colorful.....1 pt

Example:  $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$


+


=


### Common Multiples

My numbers are \_\_\_\_\_ and \_\_\_\_\_.

List all of the common multiples of these two numbers (3 points)

How can you use this information to add and subtract fractions involving these two numbers? (2 points)

### Quiz

Write a quiz over adding and subtracting fractions. Your quiz must have at least 5 questions that can be multiple choice, short answer, extended response, or any combination of these formats. At least 2 questions must involve adding fractions and at least 2 questions must involve subtracting fractions (you can use both in the same question if you would like) and at least one question must be some kind of a word problem. On a separate sheet of paper, write an answer key that shows how to solve your questions.

Points:

2 questions involving adding.....	2 pts
2 questions involving subtracting.....	2 pts
At least one word problem.....	1 pt
5 questions answered correctly on the answer key.....	5 pts

### Poster

Illustrate in a poster how to add and subtract fractions. Your poster should include at least 2 examples: one of adding and one of subtracting, and should explain each step in 1-2 sentences. Illustrate the steps in a colorful and creative way that is neat enough to be displayed on a classroom wall.

#### Points:

Poster accurately explains all steps to adding fractions.....3 pts

Poster accurately explains all steps to subtracting fractions.....3 pts

At least one example of adding fractions is illustrated.....1 pt

At least one example of subtracting fractions is illustrated.....1 pt

Poster is colorful, creative, and neat.....2 pts

### Recipe

Choose a favorite recipe that has at least 5 fractions in the ingredients. Double this recipe by multiplying the whole numbers by two (for example, 1 egg is now 2 eggs) and adding the fractions (for example,  $\frac{1}{4}$  cup of sugar plus  $\frac{1}{4}$  cup of sugar makes  $\frac{1}{2}$  cup of sugar). Be sure to simplify any fractions you use. Turn in a copy of the original recipe, along with a copy of the new, doubled recipe. On the new copy, add all of the fractions you used to find the total amount of ingredients (hint, 1 teaspoon =  $\frac{1}{48}$  cup and 1 tablespoon =  $\frac{1}{16}$  cup). 2 bonus points will be added to your final project grade if you actually make the recipe and bring in samples for the whole class to try.

Points:

Original recipe is included and contains 5 fractional measurements.....2 pts

All measurements are accurately doubled.....5 pts

Total number of ingredients is accurately added.....3 pts



### Word Problem Story

Write a word problem story (minimum of one paragraph long with a beginning, middle, and end) that has both a problem and the solution to that problem. Your story should give an example of someone adding and subtracting fractions in real life. By reading the story, I should be able to figure out what fraction they started with, what fractions were added and subtracted, and what the final amount was. After your story is written, write the number sentence that you want readers to get out of your story.

Points:

Story has a beginning, middle, and end.....2 pts

Story involves both adding and subtracting fractions in real life.....4 pts

Story includes a final amount after adding and subtracting.....2 pts

Number sentence includes all operations and numbers mentioned in the story.....2 pts

### Sample Word Problem Story

One day, Susie decided to bake a cake for her best friend's birthday. "She'll be so surprised," Susie said to herself, opening the cupboards and finding the ingredients she needed for a yummy chocolate cake. "2 eggs...check. Two cups of flour...check. One and a quarter cups of sugar...oh no!" Susie gasped. The sugar fell to the floor and spilled everywhere. She had been saving back a cup and a half of sugar for the cake, but now that she spilled the cup and a quarter that she needed, there was only a quarter of a cup left. What would she do?

Then Susie had a thought. Granny always had sugar for baking. She would have more than enough sugar for Susie to borrow some for her cake. She ran down the street to Granny's house and knocked on the door. "Granny, I need to borrow some sugar!" She yelled before her grandmother had even fully opened the door.

"Oh dear," Granny said, "It sounds like an emergency. I hope I have enough to help you. I just used most of my sugar making cookies." Granny went to the kitchen and carefully measured out the sugar that she had left, "I only have one and one third cup," Granny said, "You can have it all. I just hope that's enough."

Suddenly Susie realized she couldn't remember how much she actually needed, "Thank you Granny. I need to go measure right now and make sure this is enough!" Susie ran out the door and back up the street just as fast as she had gotten there. She carefully added Granny's sugar to what she had and measured it. "One and seven twelfths cups," she breathed a sigh of relief, "that's way more than one and a quarter cup. This is going to be the best cake ever!"

Number Sentence:  $1\frac{1}{2} - 1\frac{1}{4} + 1\frac{1}{3} = 1\frac{7}{12}$

### Pizza Chef

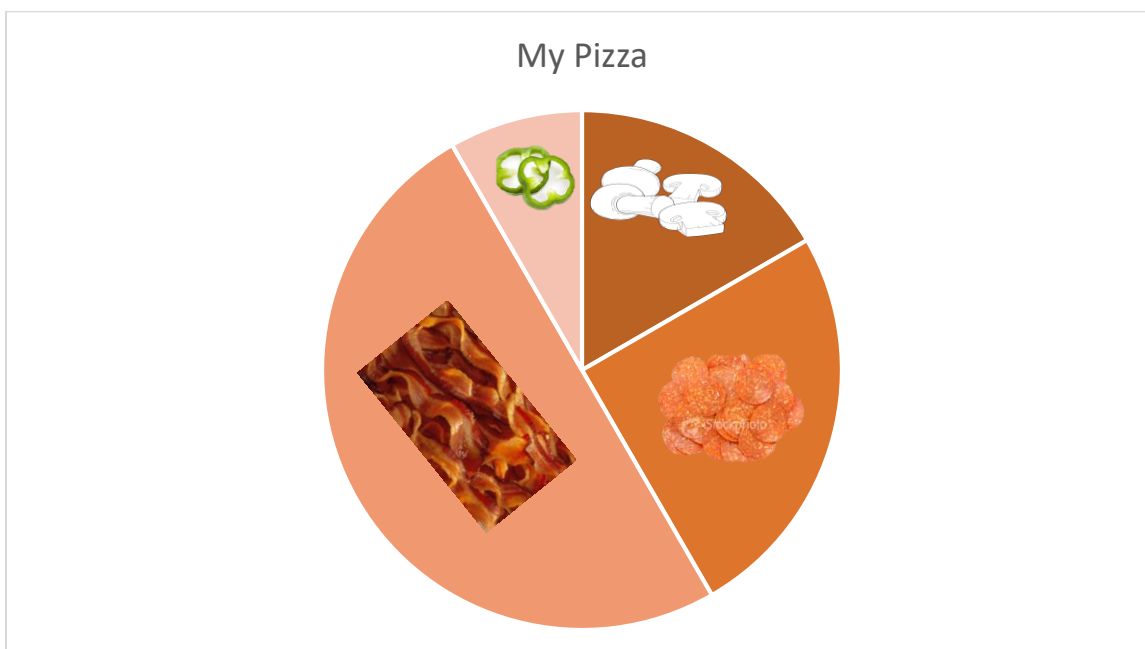
Design a pizza that will be shared by at least four friends. Every friend must eat a different fraction of the pizza (use different denominators) and a different combination of toppings. List all of the toppings and how much of the pizza each topping will be on, then create the pizza somehow (draw a picture, make an actual pizza, create a model, or any other way you could show your pizza) with the correct toppings and write a number sentence to show that the toppings add up to one whole pizza.

Pizza has at least four different toppings.....	4
Each topping is on a different fraction of the pizza.....	2
Toppings are listed and fractions add up to one whole pizza.....	2
Pizza is created correctly according to list.....	1
Number sentence is correctly written.....	1

Example:

- John eats  $\frac{1}{6}$  of the pizza with mushrooms on it
- Tim eats  $\frac{2}{8}$  of the pizza with pepperoni on it
- Maddie eats  $\frac{1}{2}$  of the pizza with bacon on it
- Kim eats  $\frac{1}{12}$  of the pizza with green peppers on it

Number sentence:  $\frac{1}{6} + \frac{2}{8} + \frac{1}{2} + \frac{1}{12} = \frac{4}{24} + \frac{6}{24} + \frac{12}{24} + \frac{2}{24} = \frac{24}{24} = 1$



### Picture Book

Write and illustrate a picture book that could be used to teach someone younger than you how to add and subtract fractions. Your picture book can be a story about someone learning fractions, a nonfiction guide to fractions, a comic book about fractions, or any other idea you can come up with, as long as it is creative and correctly demonstrates how to add and subtract fractions. Your book should flow like an actual book and contain at least two examples each of adding and subtracting fractions. Make sure you edit your story's grammar, spelling, and punctuation and reread to make sure the story makes sense.

Points:

Grammar, spelling, punctuation.....	2
Creative illustrations.....	2
Contains all correct steps to adding and subtracting fractions.....	6
Contains at least two correct addition examples.....	2
Contains at least two correct subtraction examples.....	2
Neat final copy.....	1

### Song

Write a rap, song, or song parody that teaches how to add and subtract fractions. You must turn in a copy of your lyrics and present the song to the class either in a live performance or a video of you performing your song. Somewhere in your song you should include at least two examples each of addition and subtraction of fractions.

Points:

Lyrics explain how to add and subtract fractions.....	6
Contains at least two correct addition examples.....	2
Contains at least two correct subtraction examples.....	2
Lyrics written out and turned in.....	2
Song is presented in class.....	2
Creativity in lyrics and tune.....	1

### Game

Design a game that can be used to practice the rules of adding and subtracting fractions. Create the game and bring it to class for your classmates to play. Your game should include all materials needed and a list of rules for play. If you need to borrow some materials, such as dice or playing pieces, you need to ask for them before the day your project is due.

Points:

All materials and rules sheet included.....	3
Game requires application of the addition and subtraction rules learned in class.....	6
Game includes several examples of both addition and subtraction to be solved.....	4
Game is clever and creative.....	2

### Teacher for a day

Create a PowerPoint with a guided notes page that could be used to teach students to add and subtract fractions. Your PowerPoint must have a minimum of ten slides. Your guided notes page should match the PowerPoint presentation and should have minimum of one blank per slide for students to fill in. In your PowerPoint, give at least two examples each of addition and subtraction with in-depth explanations of how to solve them. Make your slides look neat and professional, not just white slides with black print. You may choose one example included in your slide to present to the class as a review for 2 bonus points.

Points:

PowerPoint presentation with 10 slides explaining addition and subtraction.....	10
2 correct examples of addition explained.....	2
2 correct examples of subtraction explained.....	2
Slides are neat and professional.....	1

## Video

Create a video that is a minimum of 3 minutes long that could be used to help teach about adding and subtracting fractions. Your video could be a tutorial that explains how to add fractions, or telling a creative story that uses adding and subtracting fractions, but whichever approach you choose your video should include at least 2 correct examples each of adding and subtracting fractions with different denominators. If you need additional actors for your video, you can recruit classmates. Every classmate who helps in another person's video will receive one additional point towards their final grade. For your grade, you must turn in a typed script, as well as your video. Feel free to stray from the script when you actually film, use it as a guideline but don't just read it off the page and really get into whatever character you play.

Points:

Minimum of 3 minutes long.....	2
Whole video is focused on adding and subtracting fractions.....	6
At least 2 correct addition examples.....	2
At least 2 correct subtraction examples.....	2
Professionally presented (not just reading from a script).....	2
Script turned in.....	1



## Accelerated Course Worksheet

$$1. \frac{6}{10} - \frac{2}{4} =$$

$$2. \frac{9}{4} - \frac{3}{9} =$$

$$3. \frac{1}{7} + \frac{12}{10} =$$

$$4. \frac{3}{9} + \frac{11}{4} =$$

$$5. \frac{1}{2} + \frac{9}{10} =$$

$$6. \frac{5}{3} + \frac{9}{7} =$$

## Accelerated Course Worksheet Answer Key

1.  $\frac{2}{20}$  *or*  $\frac{1}{10}$

2.  $\frac{69}{36}$  *or*  $1\frac{11}{12}$

3.  $\frac{94}{70}$  *or*  $1\frac{12}{35}$

4.  $\frac{111}{36}$  *or*  $3\frac{1}{12}$

5.  $\frac{14}{10}$  *or*  $1\frac{2}{5}$

6.  $\frac{62}{21}$  *or*  $2\frac{20}{21}$

## Adding and Subtracting Fractions Word Problems #1

1. You give  $\frac{1}{3}$  of a pan of brownies to Susan and  $\frac{1}{6}$  of the pan of brownies to Patrick. How much of the pan of brownies did you give away?
2. You go out for a long walk. You walk  $\frac{3}{4}$  mile and then sit down to take a rest. Then you walk  $\frac{3}{8}$  of a mile. How far did you walk altogether?
3. Pam walks  $\frac{7}{8}$  of a mile to school. Paul walks  $\frac{1}{2}$  of a mile to school. How much farther does Pam walk than Paul?
4. A school wants to make a new playground by cleaning up an abandoned lot that is shaped like a rectangle. They give the job of planning the playground to a group of students. The students decide to use  $\frac{1}{4}$  of the playground for a basketball court and  $\frac{3}{8}$  of the playground for a soccer field. How much is left for the swings and play equipment?

## Answers

1. The common denominator is 6.  $2/6 (1 \cdot 2/3 \cdot 2) + 1/6 = 3/6$ , which simplifies to  $1/2$ .  
You have given away  $\frac{1}{2}$  of the pan.
2. The common denominator is 8.  $6/8 (3 \cdot 2/4 \cdot 2) + 3/8 = 9/8$ . We can divide 9 by 8 to get 1 remainder 1, which makes the mixed number  $1 \frac{1}{8}$ .  
You walked  $1 \frac{1}{8}$  mile.
3. The common denominator is 8.  $7/8 - 4/8 (1 \cdot 4/2 \cdot 4) = 3/8$ .  
She walks  $3/8$  of a mile farther.
4. The common denominator is 8.  $2/4 (1 \cdot 2/2 \cdot 2) + 3/8 = 5/8$  of the playground is used.  $8/8 - 5/8 = 3/8$  is left.  
 $3/8$  is left.

## Day 1 Entrance Ticket

***Welcome Class! Today we are going to start adding and subtracting fractions. I know that you have not done this yet, so don't worry if you don't know how to do these problems. Just try your best and we will go over them together later.***

1.  $\frac{1}{3} + \frac{1}{4} =$

A.  $\frac{2}{7}$

B.  $\frac{7}{12}$

C.  $\frac{12}{7}$

D.  $\frac{2}{12}$

2.  $3\frac{1}{3} + 2\frac{1}{2}$

A.  $6\frac{2}{5}$

B.  $5\frac{2}{5}$

C.  $6\frac{5}{6}$

D.  $5\frac{5}{6}$

3.  $\frac{3}{5} - \frac{1}{2} =$

A.  $\frac{1}{10}$

B.  $\frac{2}{3}$

C.  $\frac{11}{10}$

D.  $\frac{4}{7}$

4. Which fraction is NOT equivalent to  $\frac{1}{3}$ ?

A.  $\frac{30}{90}$

B.  $\frac{100}{300}$

C.  $\frac{10}{30}$

D.  $\frac{12}{32}$

5.  $\frac{4}{3} + \frac{2}{6} - \frac{7}{9} =$

A.  $\frac{6}{8}$

B.  $\frac{16}{18}$

C.  $\frac{17}{18}$

D.  $\frac{1}{8}$

### Day 1 Entrance Ticket Answer Key

1. B
2. D
3. A
4. D
5. B

## Day 1 Exit Ticket

1.  $\frac{5}{8} - \frac{1}{4} =$

a.  $\frac{3}{8}$

b.  $\frac{1}{2}$

c.  $\frac{1}{4}$

d.  $\frac{3}{4}$

2.  $\frac{3}{10} + \frac{2}{5} =$

a.  $\frac{1}{2}$

b.  $\frac{3}{10}$

c.  $\frac{1}{3}$

d.  $\frac{7}{10}$

3. Which fraction is equivalent to  $\frac{7}{10}$ ?

a.  $\frac{10}{7}$

b.  $\frac{14}{25}$

c.  $\frac{7}{5}$

d.  $\frac{21}{30}$

4. Which of the following is NOT correct?

a.  $\frac{5}{6} - \frac{2}{3} = \frac{1}{6}$

b.  $\frac{1}{3} - \frac{2}{15} = \frac{3}{15}$

c.  $\frac{7}{12} - \frac{1}{3} = \frac{1}{4}$

d.  $\frac{17}{21} - \frac{2}{3} = \frac{3}{7}$

5.  $\frac{1}{2} + 1\frac{1}{5} - \frac{3}{4} =$

a.  $\frac{9}{20}$

b.  $\frac{19}{20}$

c.  $1\frac{9}{20}$

d.  $\frac{29}{20}$



### Day 1 Exit Ticket Answer Key

1. A
2. D
3. D
4. D
5. B

## Day 2 Entrance ticket

1. Find the sum of  $\frac{2}{3}$  and  $\frac{1}{7}$ .

- a.  $\frac{3}{10}$
- b.  $\frac{3}{7}$
- c.  $\frac{17}{21}$
- d.  $\frac{19}{21}$

2. Subtract  $\frac{5}{8} - \frac{1}{4}$ .

- a.  $\frac{12}{32}$
- b.  $\frac{1}{2}$
- c.  $\frac{1}{4}$
- d.  $\frac{3}{4}$

3.  $\frac{3}{5} + \frac{1}{20} + \frac{1}{4} =$

- a.  $\frac{18}{20}$
- b.  $\frac{4}{5}$
- c.  $\frac{19}{20}$
- d.  $\frac{17}{20}$

4.  $\frac{9}{10} - \frac{1}{4} =$

- A.  $\frac{18}{40}$
- B.  $\frac{8}{4}$
- C.  $\frac{8}{10}$
- D.  $\frac{26}{40}$

5. Which fraction is not equivalent to  $\frac{2}{3}$ ?

- A.  $\frac{10}{15}$
- B.  $\frac{3}{2}$

C.  $\frac{4}{6}$

D.  $\frac{8}{12}$

## Day 2 Entrance ticket answer key

1. C
2. A
3. A
4. D
5. B

# Adding and Subtracting Fractions

## Notes

1. Make the denominators the \_\_\_\_\_ by \_\_\_\_\_.

2. \_\_\_\_\_ or \_\_\_\_\_ the new fractions.

3. Plug your answer into the original \_\_\_\_\_.

**IMPORTANT!**  
Always multiply the denominator and the numerator by the \_\_\_\_\_ number

## Examples

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

$$\frac{1}{3} + \frac{2}{5} =$$

$$\frac{3}{4} - \frac{1}{3} =$$

$$\frac{1}{2} * \text{---} = \text{---} \quad \frac{1}{4} * \text{---} = \text{---}$$

$$\frac{1}{3} * \text{---} = \text{---} \quad \frac{2}{5} * \text{---} = \text{---}$$

$$\frac{3}{4} * \text{---} = \text{---} \quad \frac{1}{3} * \frac{4}{4} = \text{---}$$

$$\text{---} + \text{---} = \text{---}$$

$$\text{---} + \text{---} = \text{---}$$

$$\text{---} + \text{---} = \text{---}$$

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

$$\frac{1}{3} + \frac{2}{5} = \text{---}$$

$$\frac{3}{4} - \frac{1}{3} = \text{---}$$

### Fractions Connect Four Instructions for Teachers

**Preparation:** Take all of the connect four tokens out of the game box. Split each color in half evenly so that you have four equal groups of tokens. Choose two different denominators, ones that are easily converted to matching denominators (thirds and sixths, fourths and eighths, etc.). Mark one half of each color with different fractional parts from the denominator chosen (three fourths, four eighths, etc.) so that you have both red and yellow pieces with each denominator.

**Game play:** Each player is assigned a denominator and is given both red and yellow pieces with that denominator. The yellow pieces mean that you add the given fraction and red pieces mean that you subtract the given fraction. Players take turns, as in regular connect four, sliding pieces into an open slot. The goal is to create a line that adds up to one. Players can stop their opponent by using a red token to subtract from their total. Players can also steal their opponent's line by adding a fraction that makes the line equal one. Once a player believes he or she has created a line that adds up to one, they must write all of the values in the form of an equation and show that the equation adds up to one in order to get a point for that line. The player with the most points at the end of game time wins.

**Extra challenge:** For accelerated groups of students that need an extra challenge, combine two pairs so that they are working with four different denominators instead of two.

### Fraction Connect Four Rules for Students

Each player is assigned a denominator and is given both red and yellow pieces with that denominator. The yellow pieces mean that you add the given fraction and red pieces mean that you subtract the given fraction. Players take turns, as in regular connect four, sliding pieces into and open slot. The goal is to create a line that adds up to one. Players can stop their opponent by using a red token to subtract from their total. Players can also steal their opponent's line by adding a fraction that makes the line equal one. Once a player believes he or she has created a line that adds up to one, they must write all of the values in the form of an equation and show that the equation adds up to one in order to get a point for that line. The player with the most points at the end of game time wins.

## Day 2 Exit Ticket

1.  $\frac{1}{2} + \frac{3}{8} =$

A.  $\frac{11}{16}$

B.  $\frac{4}{16}$

C.  $\frac{11}{10}$

D.  $\frac{4}{10}$

2. Which fraction is not equivalent to  $\frac{1}{2}$ ?

A.  $\frac{50}{100}$

B.  $\frac{24}{48}$

C.  $\frac{18}{36}$

D.  $\frac{11}{20}$

3.  $\frac{2}{3} - \frac{1}{8} =$

A.  $\frac{13}{24}$

B.  $\frac{3}{8}$

C.  $\frac{1}{8}$

D.  $\frac{3}{24}$

4.  $\frac{6}{7} + \frac{1}{2} =$

A.  $\frac{7}{7}$

B.  $1 \frac{5}{14}$

C.  $\frac{19}{14}$

D.  $\frac{7}{2}$



5.  $\frac{10}{7} - \frac{2}{3} =$

A.  $\frac{8}{4}$

B.  $\frac{16}{21}$

C.  $\frac{8}{21}$

D.  $\frac{12}{10}$

### Day 2 Exit Ticket Answer Key

1. A
2. D
3. A
4. C
5. B

**Day 3****Welcome Class**

*Today, we have a special activity to complete using all of your new skills adding and subtracting fractions. To get warmed up, look in your notebook and review all of the steps to adding and subtracting fractions. Then complete the following problem in your notebook, demonstrating each step that you used to get there. Today is going to be a great day!*

$$\frac{3}{7} + \frac{1}{2} =$$

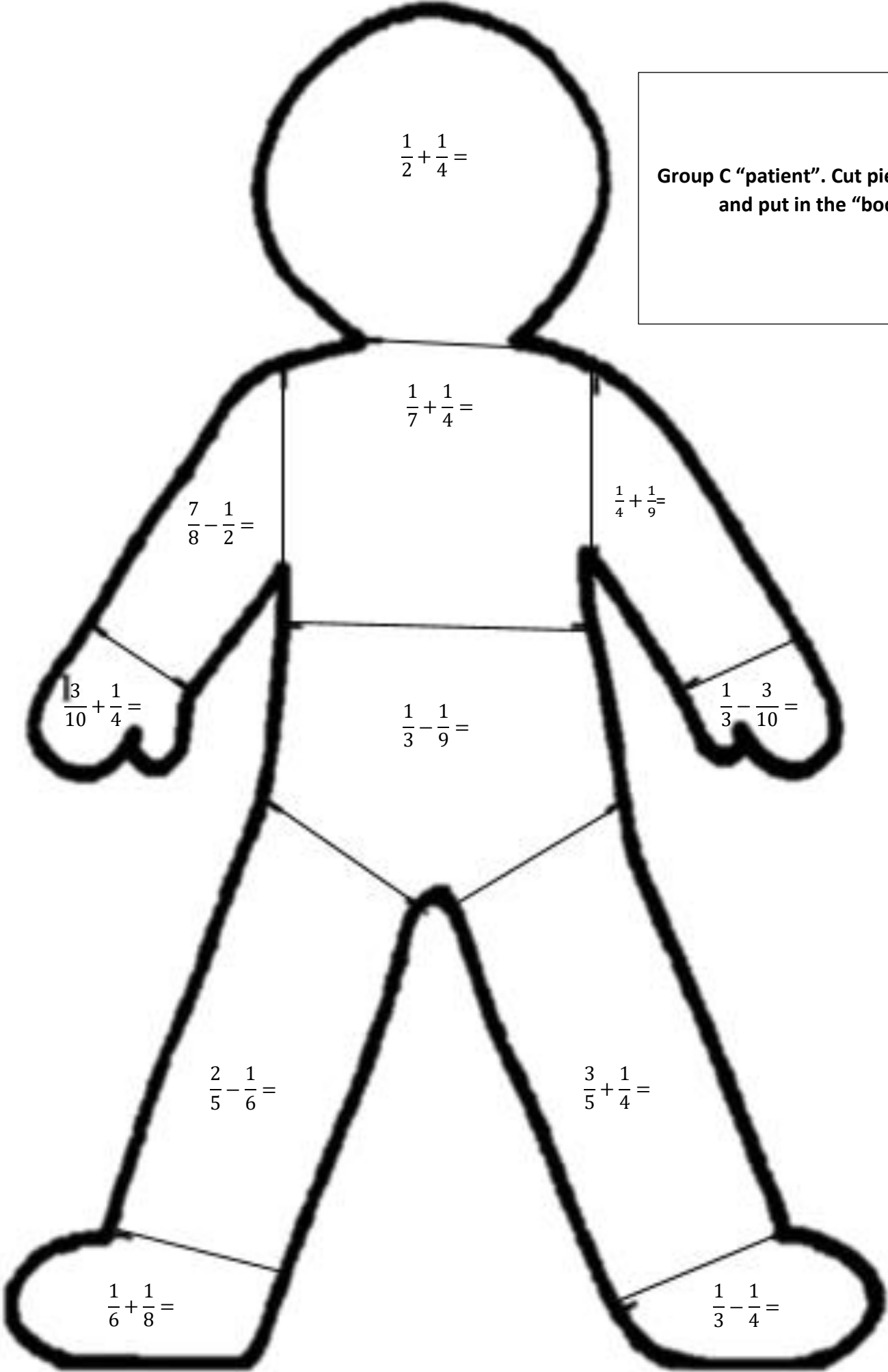
## Day 3 Entrance Ticket Answer

$$\frac{3}{7} + \frac{1}{2} =$$

$$\frac{3}{7} * \frac{2}{2} = \frac{6}{14} \quad \frac{1}{2} * \frac{7}{7} = \frac{7}{14}$$

$$\frac{6}{14} + \frac{7}{14} = \frac{13}{14}$$

$$\frac{3}{7} + \frac{1}{2} = \frac{13}{14}$$


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

**Group C “patient”. Cut pieces apart  
and put in the “body”**

$$\frac{1}{7} + \frac{1}{4} =$$

$$\frac{7}{8} - \frac{1}{2} =$$

$$\frac{1}{4} + \frac{1}{9} =$$

$$\frac{3}{10} + \frac{1}{4} =$$

$$\frac{1}{3} - \frac{1}{9} =$$

$$\frac{1}{3} - \frac{3}{10} =$$

$$\frac{2}{5} - \frac{1}{6} =$$

$$\frac{3}{5} + \frac{1}{4} =$$

$$\frac{1}{6} + \frac{1}{8} =$$

$$\frac{1}{3} - \frac{1}{4} =$$

**Group C Answer Key**

$$\frac{6}{8} \text{ or } \frac{3}{4}$$

Total Answer: \_\_\_\_\_

$$\frac{11}{28}$$

$$\frac{13}{36}$$

$$\frac{6}{16} \text{ or } \frac{3}{8}$$

$$\frac{22}{40} \text{ or } \frac{11}{20}$$

$$\frac{6}{27} \text{ or } \frac{2}{9}$$

$$\frac{1}{30}$$

$$\frac{7}{30}$$

$$\frac{17}{20}$$

$$\frac{2}{48} \text{ or } \frac{1}{24}$$

$$\frac{1}{12}$$

**Group B “patient”. Cut pieces apart  
and put in the “body”**

$$\frac{1}{6} + \frac{2}{3} =$$

$$\frac{3}{10} - \frac{2}{15} =$$

$$1\frac{1}{4} - \frac{1}{3} =$$

$$\frac{2}{3} - \frac{2}{6} =$$

$$1\frac{3}{5} + \frac{2}{3} =$$

$$\frac{3}{10} - \frac{3}{25} =$$

$$\frac{7}{10} + \frac{1}{8} =$$

$$\frac{3}{2} + \frac{1}{4} =$$

$$1\frac{2}{3} + \frac{2}{6} =$$

$$\frac{5}{6} + \frac{2}{9} =$$

$$\frac{7}{12} - \frac{2}{5} =$$

$$\frac{15}{18} \text{ or } \frac{5}{6}$$

**Group B answer key**

Total Answer: \_\_\_\_\_

$$\frac{25}{150} \text{ or } \frac{1}{6}$$

$$\frac{11}{12}$$

$$\frac{6}{18} \text{ or } \frac{1}{3}$$

$$1\frac{19}{15} \text{ or } 1\frac{4}{15}$$

$$\frac{45}{250} \text{ or } \frac{9}{50}$$

$$\frac{46}{80} \text{ or } \frac{23}{40}$$

$$\frac{14}{8} \text{ or } 1\frac{6}{8} \text{ or } 1\frac{3}{4}$$

$$1\frac{18}{18} \text{ or } 2$$

$$\frac{57}{54} \text{ or } 1\frac{3}{54} \text{ or } 1\frac{1}{18}$$

$$\frac{11}{60}$$



$$1\frac{1}{2} + 20\frac{1}{6}$$

**Group A “patient”. Cut pieces apart  
and put in the “body”**

$$8\frac{1}{2} - 7\frac{11}{12} =$$

$$\frac{7}{2} + \frac{1}{4} =$$

$$\frac{3}{7} - \frac{1}{5} =$$

$$1\frac{7}{12} + \frac{7}{15} =$$

$$\frac{10}{5} + \frac{2}{3} =$$

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

$$\frac{4}{17} + \frac{2}{7} =$$

$$15\frac{1}{4} - 7\frac{1}{6} =$$

$$17\frac{9}{10} - 14\frac{5}{6}$$

$$5\frac{7}{8} + 12\frac{3}{4} =$$

$$\frac{260}{12} \text{ or } 21\frac{8}{12} \text{ or } 21\frac{2}{3}$$

**Group A answer key**

Total Answer: \_\_\_\_\_

$$\frac{14}{24} \text{ or } \frac{7}{12}$$

$$\frac{30}{8} \text{ or } 3\frac{6}{8} \text{ or } 3\frac{2}{3}$$

$$\frac{8}{35}$$

$$\frac{189}{180} \text{ or } 1\frac{9}{180} \text{ } 1\frac{1}{20}$$

$$\frac{40}{15} \text{ or } 2\frac{10}{15} \text{ or } 2\frac{2}{3}$$

$$\frac{62}{119}$$

$$\frac{194}{24} \text{ or } 8\frac{2}{24} \text{ or } 8\frac{1}{12}$$

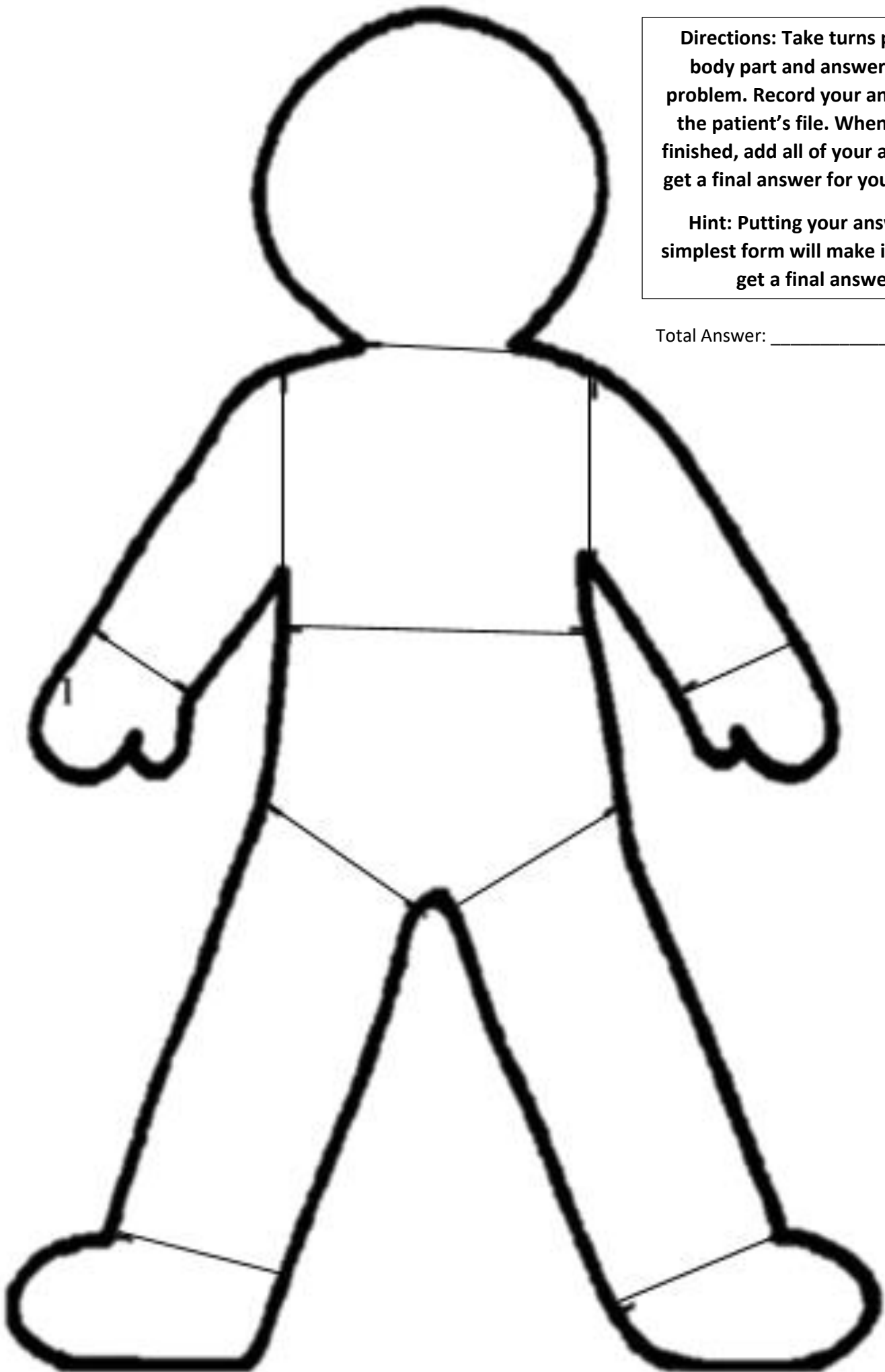
$$\frac{184}{60} \text{ or } 3\frac{4}{60} \text{ or } 3\frac{1}{15}$$

$$\frac{596}{232} \text{ or } 18\frac{20}{32} \text{ or } 18\frac{5}{8}$$

**Directions:** Take turns pulling a body part and answering the problem. Record your answers for the patient's file. When you are finished, add all of your answers to get a final answer for your patient.

**Hint:** Putting your answers in simplest form will make it easier to get a final answer.

Total Answer: \_\_\_\_\_





## **Patient Notes**

## Day 3 Exit Ticket

1.

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

A.  $\frac{2}{6}$

B.  $\frac{6}{8}$

C.  $\frac{2}{4}$

D.  $\frac{4}{8}$

2.

$$\frac{3}{7} - \frac{1}{5} =$$

A.  $\frac{8}{35}$

B.  $\frac{4}{35}$

C.  $\frac{9}{35}$

D.  $\frac{4}{12}$

3. Which fraction is not equivalent to  $\frac{1}{3}$ ?

A.  $\frac{9}{27}$

B.  $\frac{10}{30}$

C.  $\frac{100}{300}$

D.  $\frac{11}{31}$

4. If your patient required  $\frac{3}{10}$  units of blood during surgery and an additional  $\frac{2}{3}$  units after surgery, how many units of blood did your patient require altogether?

## Day 3 Exit Ticket Answer Key

1. B

2. A

3. D

4.  $\frac{29}{30}$

## Day 4 Entrance Ticket

*Welcome, class. You guys are all getting so good at adding and subtracting fractions. Today we will master the final step: word problems. I know you guys can do it, so show me how smart you are!*

While making cookies, Mary added half a cup of sugar to the batter. Then her brother added another third of a cup. How much sugar in all was added to the batter?

## Day 4 Entrance Ticket Answer Key

$$\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$$



## Worksheet A

1. You go out for a long walk. You walk three fourths of a mile and stop to take a rest. Then you walk another three eighths of a mile. How far did you walk altogether?
  
  
  
  
  
  
  
  
  
  
2. A pitcher contains two and three fourths pints of orange juice. After you pour five eighths of a pint into a glass, how much is left in the pitcher?
  
  
  
  
  
  
  
  
  
  
3. One tenth of the M&M's in a bag are red and one fifth are blue. What fraction of all the M&M's are red and blue?
  
  
  
  
  
  
  
  
  
  
4. Justin has two thirds of a Hershey bar. He shares one fourth of the candy bar with his sister Jessica. How much of the candy bar is left for Justin?
  
  
  
  
  
  
  
  
  
  
5. There is three eighths of a pizza in one box and one fourth of a pizza in another box. How much do you have altogether?
  
  
  
  
  
  
  
  
  
  
6. You give one third of a pan of brownies to Susan and one sixth of the pan of brownies to Patrick. How much of the brownies did you give away?

## Worksheet A Answer Key

\*Answers do not have to be in simplest form

1.  $\frac{9}{8}$  or  $1\frac{1}{8}$

2.  $\frac{17}{8}$  or  $2\frac{1}{8}$

3.  $\frac{3}{10}$

4.  $\frac{5}{12}$

5.  $\frac{5}{8}$

6.  $\frac{1}{2}$

## Worksheet B

1. Susan swims a race in twenty-nine and three tenths seconds. Patty swims the race in thirty-three and nine tenths seconds. How much faster was Susan than Patty?
  
  
  
  
  
  
  
  
  
  
2. Jackie has  $\frac{1}{3}$  of a Hershey bar. Steven has  $\frac{4}{12}$  of a Hershey bar. How much do they have together?
  
  
  
  
  
  
  
  
  
  
3. Pam walks seven eighths of a mile to school. Paul walks half a mile to school. How much farther does Pam walk than Paul?
  
  
  
  
  
  
  
  
  
  
4. Luis and Carolyn have three hours to paint a room. During that time, Luis paints three tenths of the room and Carolyn paints three fifths. How much of the room is painted after three hours?
  
  
  
  
  
  
  
  
  
  
5. In the problem above, if Carolyn used five sixths of a gallon of paint and Luis used one twelfth of a gallon of paint, how much paint did they use in all?
  
  
  
  
  
  
  
  
  
  
6. A pitcher contains  $2\frac{3}{4}$  pints of orange juice. After you pour  $\frac{5}{8}$  of a pint into a glass, how much is left in the pitcher?

## Worksheet B Answer Key

\*Answers do not need to be in simplest form

1.  $\frac{23}{5}$  or  $4\frac{3}{5}$

2.  $\frac{2}{3}$

3.  $\frac{3}{8}$

4.  $\frac{9}{10}$

5.  $\frac{11}{12}$

6.  $\frac{17}{8}$  or  $2\frac{1}{8}$

## Worksheet C

1. A school wants to make a new playground by cleaning up an abandoned lot that is shaped like a rectangle. They give the job of planning the playground to a group of students. The students decide to use one quarter of the lot for a basketball court three eighths of the lot for a soccer field. How much of the lot is left for swings and play equipment?
  
2.  $\frac{1}{10}$  of the M&M's in a bag are red and  $\frac{1}{5}$  are blue. What fraction of all the M&M's are not red or blue?
  
3. Felipe wants to be on the track team. On his first day of training, he runs six and one quarter times around the track. On the second day he runs eight and a half times around the track. How many more times did he run the first day than the second day?
  
4. Emily pours juice for her brother, her sister, and herself. She pours four ninths of a cup for her brother, one third of a cup for her sister, and nine tenths of a cup for herself. How many cups did Emily pour?
  
5. After my pizza party last weekend, I had one half of a sausage pizza, two thirds of a pepperoni pizza, and three fifths of a cheese pizza. I let my best friend take home some, and after that I had six tenths of a pizza left. How much did my friend take home?

## Worksheet C Answer Key

1.  $\frac{3}{8}$

2.  $\frac{7}{10}$

3.  $2\frac{1}{2}$

4.  $15\frac{1}{10}$

5.  $\frac{16}{30}$  or  $\frac{8}{15}$

## Day 4 Exit ticket

On the last test, a quarter of the class got an A, half of the class got a B, and one eighth of the class got a C. What fraction of the class scored lower than a C?

My goal for the class was for more than 90% (nine tenths) of the class to score a C or higher. Did the class meet that goal? If not, how much more of the class needed a higher score to meet the goal?

## Day 4 Exit Ticket Answer Key

$$\frac{1}{8}$$

The class did not meet the goal. To meet the goal,  $\frac{2}{80}$  or  $\frac{1}{40}$  of the class needed to have a higher score



## Day 5 Entrance Ticket

*Welcome, class. You have all been working so hard with fractions this week, and I am so proud of you. Today is your day to show what you have learned in lots of different ways. Start with these problems, and we will move on soon to some other activities.*

1. Subtract  $5/8 - 1/4$ .

a.  $12/32$

b.  $1/2$

c.  $1/4$

d.  $3/4$

2. Which fraction is not equivalent to  $\frac{1}{2}$ ?

A.  $\frac{50}{100}$

B.  $\frac{24}{48}$

C.  $\frac{18}{36}$

D.  $\frac{11}{20}$

3. Find the sum of  $2/3$  and  $1/7$ .

a.  $3/10$

b.  $3/7$

c.  $17/21$

d.  $19/21$

4. Luis and Carolyn have three hours to paint a room. During that time, Luis paints three tenths of the room and Carolyn paints three fifths. How much of the room is painted after three hours?

## Day 5 Entrance Ticket Answer Key

1. A

2. D

3. C

4.  $\frac{9}{10}$

### Center Rotation System

For today's stations, students should be grouped according to ability, giving them the opportunity for extra enrichment or intervention as needed. The highest group, group A, will begin at the "catch-up" station, where they will work on their project menu items. The lowest group, group D, should arrive at this station last, which gives them time to complete any stations that they needed extra time at. The teacher should also be available at this station to help students, especially those who require intervention, as they complete their work.

Each student receives a folder at the beginning of the day with all of the correct station worksheets inside. Some stations have differentiated worksheets and some are the same for all groups. Be sure that each student is getting the correct worksheets. Students should also bring their own math notebook and pencil for taking notes if needed.

<b><u>Group A</u></b>	<b><u>Group B</u></b>	<b><u>Group C</u></b>	<b><u>Group D</u></b>
Highest	Middle-high	Low-middle	Lowest
Students	Students	Students	Students

Station	First Rotation	Second Rotation	Third Rotation	Fourth Rotation
1	D	C	B	A
2	A	D	C	B
3	B	A	D	C
4	C	B	A	D

## Station 1:

## Trail Mix

***\*Be aware of any allergies and have alternative ingredients available if needed\****

## Materials Needed:

- Various trail mix ingredients (nuts, raisins, dry cereal, M&Ms, pretzels etc.)
- Measuring cups measuring different fractions of a cup
- Plastic bags
- Permanent markers
- Trail mix recording sheet (in student folders)

## Instructions:

An adult supervises this station to make sure that students do not take too much of one ingredient. Before students arrive, the adult assigns a different measurement to each ingredient (Ex: raisins are measured in fourths, cereal is measured in thirds, etc.) Students write their names on a plastic bag with the permanent marker and use the cups to measure out the ingredients they want in their bag. Each time an ingredient is added, the students record the measurement on their recording sheet. Students must add more than two different ingredients, and cannot add more than one cup of any one ingredient. After students are satisfied with what is in their trail mix, they must add to find out how much trail mix they have in total. Then they may eat their trail mix while they complete the questions on the recording sheet.

## Station 1:

## Groups A and B

How much of each ingredient did you include in your trail mix?

Nuts-

Raisins-

Cereal-

M&Ms-

Pretzels-

How much trail mix is in your bag in all?

If a serving is exactly one and one third cups of trail mix, how much do you need to add or take away from your bag to get one serving?

If you shared one fourth of a cup of your trail mix with a friend, and one third of a cup with another friend, how much would be left for you?

## Station 1:

## Groups C and D

How much of each ingredient did you include in your trail mix?

Nuts-

Raisins-

Cereal-

M&Ms-

Pretzels-

Add the amount of nuts and raisins in your bag.

Add the amount of cereal to the previous number.

Add the amount of M&Ms to the previous number.

Add the amount of pretzels to the previous number to get the total amount of trail mix in your bag.

If one serving of trail mix is exactly one cup, how much do you need to add or take away from your bag to get one serving?

If you shared half a cup of your trail mix with a friend, how much would be left for you?

## Station 2:

## Card Game

## Materials Needed:

- Playing cards (face cards removed)
- Operation cards (index cards marked + or -)
- Tape line on table
- Recording sheet (in student folders)

Instructions: A line is taped on the table. This is your fraction line. Sort the playing cards into four piles, one on each corner of the line. Place the operation cards in the middle of the line. On “Go” five students flip over one card from each pile. Place the top cards above the line, the bottom cards below the line, and the operation card in the middle, so that you have two fractions to add and subtract. Everyone at the table tries to solve the problem. The first person to solve it correctly gets a point, and makes a tally mark in the score box on their paper. Everyone else still needs to solve the problem though, because if you catch somebody giving the incorrect answer, you get their point. Everyone in the group needs to record the problem and the correct answer on your recording sheet. Discard the cards into a separate pile and flip over a new set of cards. If you run out of cards and still have time, shuffle the cards and make four new piles. Continue playing the entire time.

My Score:

Station 2 Recording Sheet:

All Groups

**Record the problems that your group solved while playing the card game, along with their answers. Whenever you get a point, make a tally mark in the box to record your score.**

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_



Station 3:  
Error Analysis

Materials Needed:

- Pencils
- Error analysis worksheets (in student folders)

Instructions: Pretend you are the teacher grading all of your students' hard work. Look over the problems on your worksheet and determine whether the student did their work correctly or incorrectly. If the student is incorrect, show what they did wrong and how you would correct their work. If the student is correct, prove that their answer is correct. If you finish before time is up, write on the back of your page how you would teach these students so that they remember not to make the same mistakes again. Discuss these ideas with your group.

Station 3:

Group A

1. Check Bill's work on the following problem:

$$\frac{3}{10} - \frac{3}{25}$$

$$\frac{3}{10} * \frac{5}{5} = \frac{15}{50} \quad \frac{3}{25} * \frac{2}{2} = \frac{6}{50}$$

$$\frac{15}{50} - \frac{6}{50} = \frac{21}{50}$$

Is Bill's thinking correct? Prove what he did right or wrong and explain how you would correct any mistakes he made.

2. Check Sally's work on the following problem:

$$21\frac{1}{5} + 6\frac{2}{3} =$$

$$\frac{1}{5} * \frac{3}{3} = \frac{3}{15} \quad \frac{2}{3} * \frac{5}{5} = \frac{10}{15}$$

$$21+3=24 \quad 6+10=16$$

$$\frac{24}{15} + \frac{16}{15} = \frac{40}{15}$$

Is Sally's thinking correct? Prove what she did right or wrong and explain how you would correct any mistakes she made.

Station 3:

Group B

1. Check Caroline's work on the following problem:

$$\frac{3}{5} + \frac{1}{3} =$$

$$\frac{3}{5} * \frac{1}{3} = \frac{3}{15} \quad \frac{1}{3} * \frac{3}{5} = \frac{3}{15}$$

$$\frac{3}{15} + \frac{3}{15} = \frac{6}{15}$$

Is Caroline's thinking correct? Prove what she did right or wrong and explain how you would correct any mistakes she made.

2. Check David's work on the following problem:

$$\frac{2}{5} - \frac{1}{6} =$$

$$\frac{2}{5} * \frac{6}{6} = \frac{12}{30} \quad \frac{1}{6} * \frac{5}{5} = \frac{5}{30}$$

$$\frac{12}{30} - \frac{5}{30} = \frac{7}{30}$$

Is David's thinking correct? Prove what he did right or wrong and explain how you would correct any mistakes he made.

Station 3:

Group C

1. Check Becky's work on the following problem:

$$\frac{2}{5} - \frac{1}{6} =$$

$$\frac{2}{5} * \frac{1}{6} = \frac{2}{30} \quad \frac{1}{6} * \frac{1}{5} = \frac{1}{30}$$

$$\frac{2}{30} - \frac{1}{30} = \frac{1}{30}$$

Is Becky's thinking correct? Prove what she did right or wrong and explain how you would correct any mistakes she made.

2. Check Andrew's work on the following problem:

$$\frac{1}{5} + \frac{5}{7} =$$

$$\frac{1}{5} * \frac{7}{7} = \frac{7}{35} \quad \frac{5}{7} * \frac{5}{5} = \frac{25}{35}$$

$$\frac{7}{35} + \frac{25}{35} = \frac{32}{70}$$

Is Andrew's thinking correct? Prove what he did right or wrong and explain how you would correct any mistakes he made.

Station 3:

Group D

1. Check Colin's work on the following problem:

$$\frac{1}{4} + \frac{1}{9} =$$

$$1+1=2$$

$$4+9=13$$

$$\frac{1}{4} + \frac{1}{9} = \frac{2}{13}$$

Is Colin's thinking correct? Prove what he did right or wrong and explain how you would correct any mistakes he made.

2. Check Rachel's work on the following problem:

$$\frac{1}{3} - \frac{1}{4} =$$

$$\frac{1}{3} * \frac{3}{4} = \frac{3}{12} \quad \frac{1}{4} * \frac{3}{3} = \frac{3}{12}$$

$$\frac{3}{12} - \frac{3}{12} = 0$$

Is Rachel's thinking correct? Prove what she did right or wrong and explain how you would correct any mistakes she made.

## Station 3:

## Answer Key

## Group A:

1. Incorrect. Bill added instead of subtracting.

$$\frac{3}{10} - \frac{3}{25} =$$

$$\frac{3}{10} * \frac{5}{5} = \frac{15}{50} \quad \frac{3}{25} * \frac{2}{2} = \frac{6}{50}$$

$$\frac{15}{50} - \frac{6}{50} = \frac{9}{50}$$

2. Incorrect. Sally did not convert the mixed numbers correctly.

$$21\frac{1}{5} + 6\frac{2}{3} =$$

$$\frac{1}{5} * \frac{3}{3} = \frac{3}{15} \quad \frac{2}{3} * \frac{5}{5} = \frac{10}{15}$$

$$21 * 15 = 315 \quad 6 * 15 = 90$$

$$315 + 3 = 318 \quad 90 + 10 = 100$$

$$\frac{318}{15} + \frac{100}{15} = \frac{418}{15}$$

## Group B:

1. Incorrect. Caroline did not multiply the numerator and the denominator by the same number.

$$\frac{3}{5} + \frac{1}{3} =$$

$$\frac{3}{5} * \frac{3}{3} = \frac{9}{15} \quad \frac{1}{3} * \frac{5}{5} = \frac{5}{15}$$

$$\frac{9}{15} + \frac{5}{15} = \frac{14}{15}$$

2. Incorrect. David made an error in his multiplication.

$$\frac{2}{5} - \frac{1}{6} =$$

$$\frac{2}{5} * \frac{6}{6} = \frac{12}{30} \quad \frac{1}{6} * \frac{5}{5} = \frac{5}{30}$$

$$\frac{12}{30} - \frac{5}{30} = \frac{7}{30}$$

Group C:

1. Incorrect. Becky did not multiply the numerator and the denominator by the same number.

$$\frac{2}{5} - \frac{1}{6}$$

$$\frac{2}{5} * \frac{6}{6} = \frac{12}{30} \quad \frac{1}{6} * \frac{5}{5} = \frac{5}{30}$$

$$\frac{12}{30} - \frac{5}{30} = \frac{7}{30}$$

2. Incorrect. Andrew added the denominators instead of leaving them the same.

$$\frac{1}{5} + \frac{5}{7} =$$

$$\frac{1}{5} * \frac{7}{7} = \frac{7}{35} \quad \frac{5}{7} * \frac{5}{5} = \frac{25}{35}$$

$$\frac{7}{35} + \frac{25}{35} = \frac{32}{35}$$

Group D

1. Incorrect. Colin did not make the denominators the same before adding.

$$\frac{1}{4} + \frac{1}{9} =$$

$$\frac{1}{4} * \frac{9}{9} = \frac{9}{36} \quad \frac{1}{9} * \frac{4}{4} = \frac{4}{36}$$

$$\frac{9}{36} + \frac{4}{36} = \frac{13}{36}$$

2. Incorrect. Rachel did not multiply the first numerator and denominator by the same number.

$$\frac{1}{3} - \frac{1}{4} =$$

$$\frac{1}{3} * \frac{4}{4} = \frac{4}{12} \quad \frac{1}{4} * \frac{3}{3} = \frac{3}{12}$$

$$\frac{4}{12} - \frac{3}{12} = \frac{1}{12}$$

## Station 4:

## Catch-up

## Materials Needed:

- All materials in folder
- Pencils
- Project menus
- Project menu rubrics
- Project supplies (art supplies, iPad/computers, paper, etc.)
- [Fractions computer game](#)

Instructions: Be prepared to show what you are working on. You have three tasks to complete at this station:

1. Finish any work from other stations that you have not completed.
2. Finish any work on your project menu that you have not completed.
3. Get on the computer and play the fraction game



## Resources

<http://theelementarymathmaniac.blogspot.com/2013/05/no-prep-differentiated-fraction-game.html?m=1> (Equivalent fractions counter game)

<http://www.k5learning.com/free-math-worksheets/fifth-grade-5/word-problems> (sample word problems)

Accelerated course worksheet generated by

<http://www.homeschoolmath.net/worksheets/fraction.php>

<http://teachingtoinspire.com/2016/02/higher-level-math-centers.html> (target number board)

<http://www.ncesd.org/Page/983> (Common Core Vocabulary Words)

<https://www.youtube.com/watch?v=FjmHXxqzSVA> (adding and subtracting fractions song)

Some multiple choice questions from <https://www.enslow.com/resources/978-0-7660-3780-9.pdf> and <http://www.proprofs.com/quiz-school/story.php?title=adding-subtracting-fractions-quiz>

<http://www.notimeforflashcards.com/2015/02/fraction-game-connect-4-learning-school.html> (Fractions Connect Four original idea that I modified)

<http://craziernessinfifth.blogspot.com/2015/11/the-operating-room.html> (Operation activity)

<https://www.youtube.com/watch?v=E3XsWHZGHTo> (Hospital sound effects)

Fennell, Francis M. "Chapter 8." *Mathematics Unlimited: Teacher's Resource Book*. New York: Holt, Rinehart and Winston, 1987. 97-102. Print. (Sample problems)

<https://www.education.com/activity/article/simplest-form/> (Fractions card game modified)

[http://www.math-play.com/fractions-board-game/fractions-board-game\\_html5.html](http://www.math-play.com/fractions-board-game/fractions-board-game_html5.html) (adding and subtracting fractions online game)