Task: Celebrate!	**4th Grade**
Your teacher is throwing a party! Your mom has been asked to provide rectangular sheet cakes cut into 12 equal pieces for the party. Your teacher tells you that each student will be given 2 pieces of a cake to eat. (1) What fraction of one cake will each student eat? (2) If there are 21 students and 1 teacher, how many cakes should your mom bake so that each person gets 2 pieces of cake? Use a model to justify your solution. (3) If each student and the teacher eat two pieces of cake, how much total cake will be eaten? Explain how you know.	
Teacher Notes:	
For Question 1, students can report their answer without simplifying the fraction. You can add this skill to the task, but the task will still meet the designated Common Core State Standard even if students cannot yet simplify fractions. For Question 2 and 3, the Common Core State Standard of focus is for students to multiply a fraction by a whole number. As you monitor the class, encourage them to solve the problem using multiplication if they are not doing so already. For Question 3, if the students are answering in terms of total number of pieces of cake eaten, you should prompt them to report their answer in fractional form.	
Common Core State Standards for Mathematical Content	**Common Core State Standards for Mathematical Practice**
4.NF.B.4c Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.
Essential Understandings	
▪ The rational numbers allow us to solve problems that are not possible to solve with just whole numbers. ▪ One interpretation of a rational number is as a part-whole relationship. ▪ The interpretations of the operations on rational numbers are essentially the same as those on whole numbers, but some interpretations require adaptation, and the algorithms are different.	

<table>
<tr><th colspan="2">Explore Phase</th></tr>
<tr><th>Possible Solution Path</th><th>Assessing and Advancing Questions</th></tr>
<tr><td>(1) May model the amount 1 student would eat as a rectangle divided into 3 rows and 4 columns with 2 of the “pieces” shaded and state that the fraction is 2/12 or 1/6.
(2) May draw the model as above and shade 2 pieces at a time until they have shaded enough cake for 22 people. They should then note that each square is 1/12, and they have shaded 44 squares. They should state that they need 44/12 or 3 and 8/12 cakes. Students may simplify this fraction and report 3 and 2/3 cakes.
(3) Should notice that they cannot make a fraction of a cake, so they should bake 4 in order to have MORE than enough.</td><td>Assessing Questions
▪ Tell me how you decided to draw your cake like that.
▪ What process did you use to find how many pieces of cake you would need to feed the entire class?
▪ Why would making 3 cakes not be sufficient?
Advancing Questions
▪ Looking at the numbers 22 and 2/12, how could you have arrived at the answer 44/12 without modeling?
▪ How much cake will be left over?
▪ How can we write equations to show the two equivalent fractions in this problem?</td></tr>
<tr><th colspan="2">Possible Student Misconceptions</th></tr>
<tr><td>▪ When modeling, a student could think that they should always model with a rectangle divided into n columns, rather than considering the context.
▪ Could consider 1 piece as the whole in parts of the problem.
▪ Could consider all 4 cakes as the whole and arrive at the answer 44/48 or 11/12 for part 3 instead of viewing 1 cake as the whole.
▪ May calculate that 44 pieces are needed, but not recognize this as 44/12.
▪ May round answer to Part 2 down to 3 cakes rather than up to 4 cakes.</td><td>Assessing Questions
▪ Tell me what a rectangular cake usually looks like. Can you cut that into 12 pieces, as you would a cake?
▪ What is the whole in this problem? A piece or a cake?
▪ What fraction of the whole is 1 piece of cake?
▪ Can you make a part of a cake?
▪ If you need more than 3 cakes to feed everyone, how many cakes should you make?</td></tr>
<tr><th>Entry/Extensions</th><th>Assessing and Advancing Questions</th></tr>
<tr><td>If students can’t get started….</td><td>Assessing Questions
▪ Draw me a picture of a rectangular cake with any number of pieces you like. Can you make it have 12 equal pieces?
Advancing Questions
▪ Pretend that people are coming up and taking pieces of cake. How could you show that one person is taking two pieces? What if two people had gotten cake? Keep going until 22 people have taken cake.</td></tr>
<tr><td>If students finish early….</td><td>Assessing Questions
▪ How did you solve this problem? Write a letter to your classmates</td></tr>
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	explaining the process you used. **Advancing Questions** ▪ What if 1/3 of the class was ill the day of the party? How many pieces of cake could each person have, if you had already baked 4 cakes?
Discuss/Analyze	
Whole Group Questions	
Write the key understandings that students should come to in the discussion of this task and questions you can ask in the whole group setting to support arrival at these key understandings	
The Fraction Model ▪ How did you model the cake that one person would eat in Step 1 or 2? ▪ Did anyone do it differently? ▪ Are these solutions correct?	
The Fractions ▪ What fraction of cake was each student allowed to eat? ▪ How did you decide this? ▪ What process did you use to decide how many pieces of cake you needed total? ▪ Did anyone use a different process? ▪ Do both of these processes work? ▪ What 2 ways can we represent our answer? (i.e. mixed number, improper fraction)	
The Context ▪ How many cakes do you need to bake to feed everyone 2 pieces? ▪ Can we leave our answer as 3 and 2/3? Why not? ▪ Since 3 is the whole number part of this answer, should you bake 3 cakes? ▪ What whole number is this fraction closest to? ▪ How many cakes should you bake?	
Multiplying a Whole Number Times a Fraction ▪ Can anyone see a relationship between the numbers 2 and 44/12 that gives us a clue how to solve these without models? ▪ Do you think the relationship $a \times (b / c) = (a \times b) / c$ always works? ▪ Can you give me another example of this?	