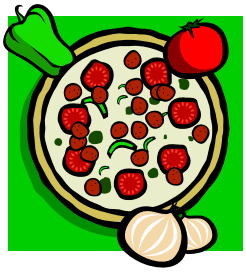


Culminating Task: Pizza Parlor (Revisited)

STANDARDS FOR MATHEMATICAL CONTENT

MCC4.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 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.

STANDARDS FOR MATHEMATICAL PRACTICE

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.

BACKGROUND KNOWLEDGE

The solutions for the different order cards are shown below.

	Toppings													Order Totals			
	Extra Cheese	Beef	Buffalo Chicken	Ham	Pepperoni	Sausage	Anchovies	Green Peppers	Jalapeño Peppers	Mushrooms	Onions	Pineapple	Sliced Tomatoes	Improper Fraction	Mixed Number	Fraction of Plain Cheese	Total Pizzas Ordered
Order #1 Customer Name Mrs. Sanchez	$\frac{1}{2}$				$\frac{3}{4}$	$\frac{1}{4}$					$\frac{1}{2}$			$\frac{8}{4}$	2	$\frac{0}{4}$	2
Order #2 Customer Name Mr. Adams										$\frac{3}{2}$	$\frac{1}{4}$		$\frac{3}{4}$	$\frac{10}{4}$	$2\frac{2}{4}$	$\frac{2}{4}$	3
Order #3 Customer Name Sammie				$\frac{3}{8}$			$\frac{1}{8}$					$\frac{3}{4}$		$\frac{10}{8}$	$1\frac{2}{8}$	$\frac{6}{8}$	2
Order #4 Customer Name Ally					$\frac{11}{8}$			$\frac{7}{4}$		$\frac{7}{4}$				$\frac{39}{8}$	$4\frac{7}{8}$	$\frac{1}{8}$	5
Order #5 Customer Name Reggie		$\frac{5}{3}$						$\frac{3}{6}$	$\frac{4}{3}$					$\frac{21}{6}$	$3\frac{3}{6}$	$\frac{3}{6}$	4

	Toppings													Order Totals			
	Extra Cheese	Beef	Buffalo Chicken	Ham	Pepperoni	Sausage	Anchovies	Green Peppers	Jalapeño Peppers	Mushrooms	Onions	Pineapple	Sliced Tomatoes	Improper Fraction	Mixed Number	Fraction of Plain Cheese	Total Pizzas Ordered
Order #1 Customer Name Hilda	$\frac{3}{2}$			$\frac{5}{4}$								$\frac{1}{4}$		$\frac{12}{4}$	3	$\frac{0}{4}$	3
Order #2 Customer Name Nimesh						$\frac{1}{2}$					$\frac{15}{10}$	$\frac{6}{10}$		$\frac{26}{10}$	$2\frac{6}{10}$	$\frac{4}{10}$	3
Order #3 Customer Name Norah	$\frac{5}{4}$		$\frac{3}{4}$			$\frac{3}{4}$								$\frac{11}{4}$	$2\frac{3}{4}$	$\frac{1}{4}$	3
Order #4 Customer Name Ms. Thomas	$\frac{7}{8}$				$\frac{3}{4}$		$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$					$\frac{31}{4}$	$7\frac{3}{4}$	$\frac{1}{4}$	8
Order #5 Customer Name Laticia		$\frac{3}{10}$	$\frac{15}{10}$								$\frac{8}{10}$		$\frac{8}{10}$	$\frac{34}{10}$	$3\frac{4}{10}$	$\frac{6}{10}$	4

ESSENTIAL QUESTIONS

- What is a fraction and how can it be represented?
- What is an improper fraction and how can it be represented?
- What is a mixed number and how can it be represented?
- What is the relationship between a mixed number and an improper fraction?
- How can improper fractions and mixed numbers be used interchangeably?
- How do we add fractions?
- How do we apply our understanding of fractions in everyday life?

MATERIALS

- "Pizza Parlor, Order Form" student recording sheet
- "Pizza Parlor, Order Cards" students sheet
- "Pizza Parlor, Pizzas" student recording sheet
- Colored pencils or crayons
- Scissors and glue
- Plain paper (students will glue their work on a sheet of paper for display)

GROUPING

Individual/Partner Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Students use improper fractions and mixed numbers interchangeably and add fractions to complete pizza orders.

Comments

This task is designed to be used after students have done the Fraction Cookies Bakery (see page 30 of this unit). Therefore students should have worked with improper fractions, mixed numbers, and addition of common fractions. In this task, students will use rectangular models for the pizzas because rectangles are much easier for students to divide equally into fifths, sixths, and tenths.

Introduce this task by telling students that they have been hired at a Pizza Parlor and they will be in charge of creating the pizzas with the correct toppings. Explain to students that the customers are very picky and quite specific when ordering pizzas. Only one topping goes on each part of the pizza and if there aren't enough toppings for a whole pizza, the remaining part will be left plain.

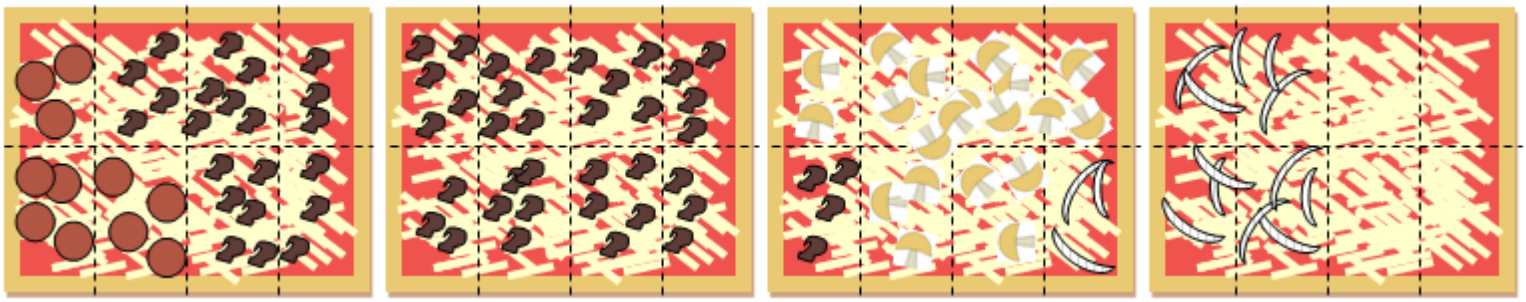
Before students work on this task with a partner or independently, they should solve one problem as a class, providing a model of what is expected.

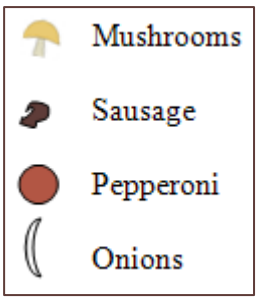
Kaden called to order pizza for his family. Most of the people in his family like sausage on their pizzas so, he ordered $\frac{7}{4}$ sausage. Kaden is the only one who likes pepperoni, so he ordered $\frac{3}{8}$ pepperoni. His sisters, Hannah and Tamara, like vegetables on their pizza; so he also ordered $\frac{3}{4}$ mushroom, and $\frac{5}{8}$ onion.

Ask students the following questions:

- How many pizzas did he order in all?
- Will any part of the pizzas be only cheese?
- How could he write his order as an improper fraction?
- How could he write his order as a mixed number?

	Toppings													Order Totals			
	Extra Cheese	Beef	Buffalo Chicken	Ham	Pepperoni	Sausage	Anchovies	Green Peppers	Jalapeño Peppers	Mushrooms	Onions	Pineapple	Sliced Tomatoes	Improper Fraction	Mixed Number	Fraction of Plain Cheese	Total Pizzas Ordered
Order #1 Customer Name Kaden					$\frac{3}{8}$	$\frac{7}{4}$				$\frac{3}{4}$	$\frac{5}{8}$			$\frac{28}{8}$	$3\frac{4}{8}$	$\frac{4}{8}$	4





Put four blank, rectangular pizzas on the board. Discuss with the students how Kaden could show the correct toppings on each of the pizzas. First, ask students how the pizzas should be divided. Should they be divided into fourths? Eighths? (It is okay to divide the pizzas into fourths, but students would need to recognize that some of the fourths would need to be divided in half to create eighths as required.) Next, ask students how to cover $\frac{7}{4}$ pizzas with sausage if each pizza is divided into eighths. Looking at the picture, students should recognize that to cover $\frac{7}{4}$, a total of 14 eighths would need sausage. With the onions, a total of 10 eighths would need to be covered with onion. When finished placing the toppings, students should see that $\frac{4}{8}$ or $\frac{2}{4}$ of a pizza is left plain. Discuss how this could also be represented as $\frac{1}{2}$ of the pizza has no additional topping.

Using the example above as a model, allow students to work with a partner or on their own to complete the task. After students have created their pizzas, have a few students share their solution for one pizza order with the class. Allow other students to ask questions and make comments about the pizza models and their work.

Task Directions

Students will follow the directions below from the "Pizza Parlor, Pizzas" student task sheet.

> Use the pizzas below to make the customer orders. Use colored pencils or crayons to create the pizzas ordered. Once you have completed an order, cut out the pizzas and the order card and glue them to a piece of paper to display your work. Add words and numbers as needed to understand your work. Remember, customers expect you to use the fewest number of pizzas possible to complete each order. No part of a pizza should be without a topping except for one.

Also, students will follow the directions below from the "Pizza Parlor, Order Form" student recording sheet.

> Choose five of the pizza orders from the "Pizza Parlor, Order Cards" student sheet and complete the order form below.

FORMATIVE ASSESSMENT QUESTIONS

- What task have you done that will help you with this "Pizza Parlor" task?
- What order are you working on? How can you make sure you make the fewest pizzas and still fill the order?
- Into how many equal parts did you divide your pizzas? Why?
- How will you represent this improper fraction on your pizzas?
- How many pieces will have that topping? How do you know?
- How do you know this fraction of a pizza will be left plain?
- How do you know there were this many pizzas ordered?

DIFFERENTIATION

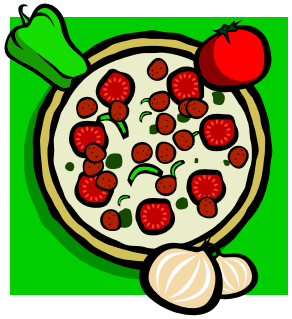
Extension

- Ask students to create orders of their own, then switch with a partner to create the confirmations for those orders. Students can be given a blank confirmation sheet or they can create their own fraction models.

Intervention

- Some students may need more examples modeled before they are able to complete this task on their own. Provide an opportunity for further small group instruction before students are asked to complete this task.

- Allow students to use pre-made fraction pieces to create the pizzas. It might be necessary to combine several sets of pieces in order to make multiple pizzas.



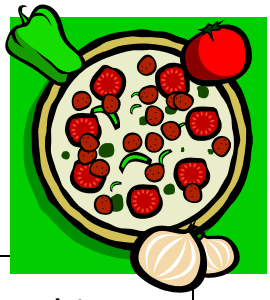
Name _____ Date_____

Pizza Parlor

Order Form

Choose five of the pizza orders from the "Pizza Parlor, Order Cards" student sheet and complete the order form below.

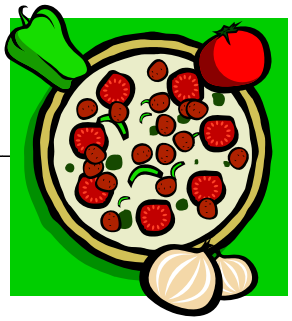
	Toppings														**Order Totals**			
	Extra Cheese	**Beef**	**Buffalo Chicken**	**Ham**	**Pepperoni**	**Sausage**	**Anchovies**	**Green Peppers**	**Jalapeño Peppers**	**Mushrooms**	**Onions**	**Pineapple**	**Sliced Tomatoes**	**Improper Fraction**	**Mixed Number**	**Fraction of Plain Cheese**	**Total Pizzas Ordered**
Order #1 Customer Name _____																	
Order #2 Customer Name _____																	
Order #3 Customer Name _____																	
Order #4 Customer Name _____																	
Order #5 Customer Name _____																	



Pizza Parlor

Order Cards

Mrs. Sanchez called to order pizza with $\frac{3}{4}$ pepperoni, $\frac{1}{2}$ extra cheese, $\frac{1}{2}$ onions, and $\frac{1}{4}$ sausage.	Mr. Adams came to pick up his pizza order. He wanted pizza with $\frac{3}{2}$ mushrooms, $\frac{1}{4}$ onions, and $\frac{3}{4}$ sliced tomatoes.
Sammie ordered pizza over the phone. He ordered $\frac{3}{4}$ pineapple and $\frac{3}{8}$ ham, and $\frac{1}{8}$ anchovies.	Ally ordered pizza for a party with her friends. She ordered $\frac{7}{4}$ green peppers, $\frac{11}{8}$ pepperoni, and $\frac{7}{4}$ mushrooms.
Reggie ordered some pizza to share with his friends. He ordered $\frac{4}{3}$ jalapeño peppers, $\frac{3}{6}$ green peppers, and $\frac{5}{3}$ beef.	Hilda called to order pizza. She wanted $\frac{3}{2}$ extra cheese, $\frac{1}{4}$ pineapple, and $\frac{5}{4}$ ham.
Mr. Nimesh ordered pizza. He ordered $\frac{15}{10}$ onions, $\frac{1}{2}$ sausage, and $\frac{6}{10}$ pineapples.	Norah ordered pizza to share with her family. She ordered $\frac{5}{4}$ extra cheese, $\frac{3}{4}$ buffalo chicken and $\frac{3}{4}$ sausage.
Ms. Thomas ordered pizza for her students. She ordered $\frac{3}{4}$ jalapeño peppers, $\frac{3}{4}$ green peppers, $\frac{3}{4}$ pepperoni, $\frac{7}{8}$ extra cheese, and $\frac{3}{4}$ anchovies.	Laticia called to order pizza. She wanted $\frac{3}{10}$ beef, $\frac{8}{10}$ onions, $\frac{15}{10}$ buffalo chicken, and $\frac{6}{10}$ sliced tomatoes.



Name _____ Date _____

Pizza Parlor

Pizzas

Use the pizzas below to make the customer orders. Use colored pencils or crayons to create the pizzas ordered. Once you have completed an order, cut out the pizzas and the order card and glue them to a piece of paper to display your work. Add words and numbers as needed to understand your work. Remember, customers expect you to use the fewest number of pizzas possible to complete each order. No part of a pizza should be without a topping except for one.