Scaffolding Task: Pizza Party

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.*

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 students should have had multiple opportunities with paper-folding fractions. To create eighths, students can fold the pizza in half, then in fourths, and finally into eighths.

Each student's story problems may be unique. To assess student work, look for an illustration made with the pizza slices that matches the events in the story, an accurate number sentence for the story, and clear explanations. Student explanations should provide evidence that they understood why the denominator is 8. The standard explicitly says students should write their fractions as the sum of 1/b. Guide students toward this goal, having them write number sentences that reflect this. For example, if someone ate ⅜ or a pizza then they actually ate one slice, then another, then a third slice or ⅛ + ⅛ + ⅛. You could simply joke around with kids about how no one really stuffs three slices in their mouth at once!

ESSENTIAL QUESTIONS

- What happens to the denominator when I add fractions with like denominators?
- Why does the denominator remain the same when I add fractions with like denominators?
- How do we add fractions with like denominators?

MATERIALS

- "Pizza Party" student recording sheet

- "Pizza Party, Pizza Dough" student sheet (each sheet has enough circles for two students)
- Colored pencils or crayons
- Glue stick

GROUPING

Individual Task

TASK DESCRIPTION, DEVELOPMENT, AND DISCUSSION

Using fraction models divided into eighths (pizzas), students create addition and subtraction story problems.

Comments

One way to introduce the task is by describing a family tradition of having pizza and a movie every Friday evening. Explain that the family makes two pizzas for dinner and rents a movie for the family to watch. There is always one cheese pizza and one pepperoni pizza. Each pizza is cut into eight equal slices.

Discuss with the students some possible addition problems that could be done with the pieces of pizza. For example, if the mom ate two slices of cheese pizza and one slice of pepperoni pizza, how much pizza did she eat? Discuss the whole is cut into 8 equal pieces, so $\frac{2}{8}$ cheese + $\frac{1}{8}$ pepperoni = $\frac{3}{8}$ of a pizza. Have a student record the number sentence on the board, reminding students about the correct fraction notation.

As a subtraction problem, one example would be discussing the amount of cheese pizza left after the mom took two pieces. 8/8 – 2/8 = 6/8. Ask students how they might illustrate subtraction with the pizza slices. (Students may suggest crossing out the pieces removed or circling the pieces that are being subtracted.)

Sometimes students find it difficult to understand that the whole can be any shape. Therefore, it may be helpful to provide square pizzas for students to work with in addition to the circle-shaped pizzas used in this task.

Time does not permit all students to share their work with the class. However, students may be afforded the opportunity to share their work in a small group and then one student from each group may share with the whole group. Or students can share their work with a partner and two or three students can be selected to share their work with the class. Teachers need to be thoughtful about who will share during the closing of a lesson. The student(s) whose work is shared needs to add to the class discussion or take the class discussion in a specific direction. A teacher needs to think about what type of conversation will help clarify possible student misconceptions and solidify student understanding of the concepts imbedded in the task.

Task Directions

Students will follow the directions below from the "Pizza Party" student recording sheet.

> You will be writing two story problems, modeling with problem using pizzas that you create. Fold this paper in half to create two sections on the back to record your stories.

1. Create two pizzas.
    a. Cut out two circles of paper (pizza dough) and color them to look like your two favorite types of pizza.
    b. Fold the pizzas into eighths.
2. Fold this paper in half to create two sections on the back to record your pizza stories.
3. Write an addition story problem on the back of this paper.
    a. Cut out the correct number of pizza slices for your story.
    b. Glue down the pizza slices to illustrate your story.
    c. Explain how you solved the problem using words and numbers.
4. Write a subtraction story problem on the back of this paper.
    a. Cut out the correct number of pizza slices for your story.
    b. Glue down the pizza slices to illustrate your story.
    c. Explain how you solved the problem using words and numbers.

Be prepared to share your story, illustration, and solution with the class.

FORMATIVE ASSESSMENT QUESTIONS

- In your addition story, how many pieces of pizza do you have in all? How many slices of pizza in one whole? How do you write that as a fraction?
- In your subtraction story, how many pieces of pizza do you have left? How many slices of pizza in one whole? How do you write that as a fraction?
- Why does the denominator stay the same with addition and subtraction?
- Tell me the story that goes with your picture and number sentence.

DIFFERENTIATION

Extension

- Have students consider the whole to be both pizzas, for a total of 16 slices equaling one whole.
- What would happen if the pizza restaurant made a mistake and cut one of the pizzas into fourths? How does it make finding the answer to an addition or subtraction sentence more difficult if the denominators of your fractions are not the same? Have students write problems where one pizza is cut into fourths, the other is cut into eights.

Intervention

- Allow students to tell their story and model it with their pieces in a small group before gluing and labeling it on paper.

.

Name _____ Date _____

Pizza Party

You will be writing two story problems, modeling with problem using pizzas that you create. Fold this paper in half to create two sections on the back to record your stories.

1. Create two pizzas.
    a. Cut out two circles of pizza dough and color them to look like your two favorite types of pizza.
    b. Fold the pizzas into eighths.

2. Fold this paper in half to create two sections on the back to record your pizza stories.

3. Write an addition story problem on the back of this paper.
    a. Cut out the correct number of pizza slices for your story.
    b. Glue down the pizza slices to illustrate your story.
    c. Explain how you solved the problem using words and numbers.

4. Write a subtraction story problem on the back of this paper.
    a. Cut out the correct number of pizza slices for your story.
    b. Glue down the pizza slices to illustrate your story.
    c. Explain how you solved the problem using words and numbers.

Be prepared to share your story, illustration, and solution with the class.

Pizza Party

Pizza Dough