Tennessee Department of Education:

Task: Pizza Predicament	5th Grade

Two clubs are having pizza parties. For the Jump Rope Club, the sponsor will order 3 pizzas for every 4 students. For the Scrapbook Club, the sponsor will order 5 pizzas for every 8 students. Since you are in member of both clubs, you need to choose which party to attend.

    a) How much pizza would you get at each party?

    b) If you want to have the most pizza, which party should you attend? Explain.

Teacher Notes:

This standard calls for students to extend their work of partitioning a number line from third and fourth grade. Students need ample experiences to explore the concept that a fraction is a way to represent the division of two quantities. Students are expected to demonstrate their understanding using concrete materials, drawing models, and explaining their thinking when working with fractions in multiple contexts. They read 3/5 as "three-fifths" and after many experiences with sharing problems, learn that 3/5 can also be interpreted as "3 divided by 5." (http://www.katm.org/baker/media/5_FlipBook_Updated_2014.pdf)

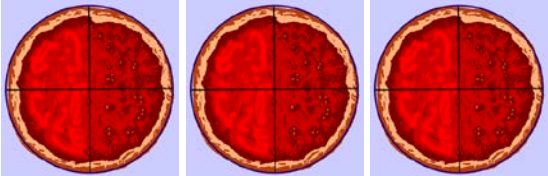| Tennessee State Standards for Mathematical Content	Tennessee State Standards for Mathematical Practice
5.NF.B.3 Interpret a fraction as division of the numerator by the denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? 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:

- A fraction describes the division of a whole (region, set, segment) into equal parts.
- The denominator of a fraction tells how many equal parts the whole or unit is divided into. The numerator tells how many equal parts are indicated.
- A fraction is relative to the size of the whole or unit.
- A fraction describes division (a/b = a ÷ b, a and b are integers with b ≠ 0), and it can be interpreted on the number line in two ways. For example, 2/3 = 2 ÷ 3. On the number line, 2 ÷ 3 can be interpreted as 2 segments where each is 1/3 of a unit (2 x 1/3) or 1/3 of 2 whole units (1/3 x 2); each is associated with the same point on the number line.

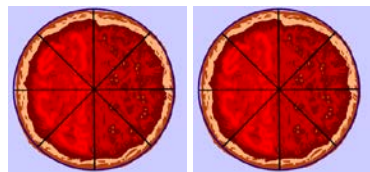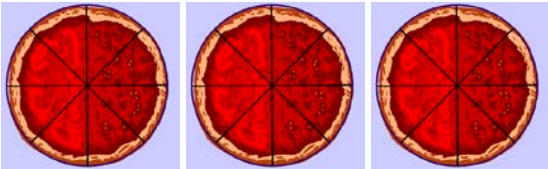| Explore Phase	
Possible Solution Paths	**Assessing and Advancing Questions**
a) (Area Model) Jump Rope Club gets 3 pizzas for every 4 people: By dividing 3 pizzas into 4 equal sized pieces each, we can see that each person receives 3 total pieces of pizzas. This is equal to 3/4 read as "three-fourths" of a pizza. Scrapbook Club gets 5 pizzas for every 8 people: By dividing 5 pizzas into 8 equal sized pieces each, we can see that each person receives 5 total pieces of pizzas. This is equal to 5/8 read as "five-eighths" of a pizza. http://www.mathwarehouse.com/fractions/manipulatives/fraction-maker-online.php	**Assessing Questions:** • What was the problem asking you to find? • Does your answer match what you were asked to find? • Can you explain your area model? • Why did you choose this model? • Why do you have 3 (or 5) pizzas? • Why did you partition each pizza into 4 (or 8) pieces? • Is your answer reasonable? How do you know? • Is there another model that you could have used? **Advancing Questions:** • What is the problem asking you to find? • In the Jump Rope Club, how many pizzas will 4 people share? • In the Scrapbook Club, how many pizzas will 8 people share? • How many ways should you divide each pizza? • Can you draw a picture to help you solve this problem?

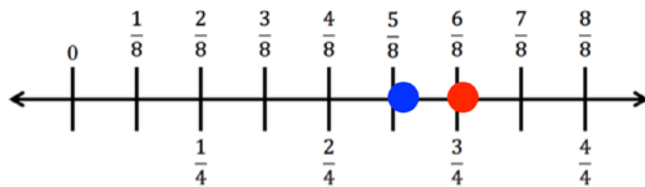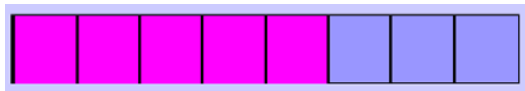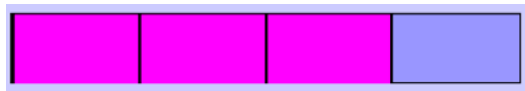|	
a) (Equations) Jump Rope Club gets 3 pizzas for every 4 people: 3 ÷ 4 = 3/4 By dividing 3 pizzas into 4 equal sized pieces each, we can see that each person gets 3/4 of a pizza. Scrapbook Club gets 5 pizzas for every 8 people: 5 ÷ 8 = 5/8 By dividing 5 pizzas into 8 equal sized pieces each, we can see that each person gets 5/8 of a pizza.	**Assessing Questions:** • Can you explain your equation? • Why did you choose to use division? • What does 3 ÷ 4 mean? • What does 5 ÷ 8 mean? • Is your answer reasonable? How do you know? • Is there another way to write your equation? **Advancing Questions:** • What is the problem asking you to find? • In the Jump Rope Club, how many pizzas will 4 people share? • In the Scrapbook Club, how many pizzas will 8 people share? • How many ways should you divide each pizza? • What numerical operation is represented by the fraction bar? • Is there an equation that could help you solve this problem?
b) You should attend the Jump Rope Club because 3/4 of a pizza is greater than 5/8 of a pizza *(Number Line)* On the number line, a number to the right is greater than a number to the left. *(Area Model)* 3/4 of a pizza (represented by the top bar in pink) is greater than 5/8 of a pizza (represented by the bottom bar in pink). 	**Assessing Questions:** • Can you explain how you got your answer? • How did you know that 3/4 was greater than 5/8? • Why did you choose to use a number line in your explanation? • Is your answer reasonable? How do you know? • Is there another way to explain your answer? **Advancing Questions:** • What is the problem asking you to find? • How can you compare fractions? • Could you place both fractions on a number line? • Can you draw a picture to help you solve this problem?

Possible Student Misconceptions	
Students believe 5/8 of a pizza is bigger than 3/4 because 5 pieces of pizza is more than 3.	• Can you draw a circle with 8 equal parts? • Can you shade 5 of the 8 parts with yellow? • How many of the 8 parts equal 3/4 of the whole? Can you draw black stripes on 3/4 of the 8 parts?
Entry/Extensions	**Assessing and Advancing Questions**
If students can't get started….	• What is the problem asking you to find? • Can you draw a picture to help you solve this problem? • Is there an equation that could help you solve this problem?
If students finish early….	• If the Safety Club had a pizza party with 4 pizzas for every 9 people, which club would you choose to go to for the most pizza?

Discuss/Analyze

Whole Group Questions

A fraction describes the division of a whole (region, set, segment) into equal parts.
• Do the pieces of a fraction have to be the same size?
• Why or why not?

The denominator of a fraction tells how many equal parts the whole or unit is divided into. The numerator tells how many equal parts are indicated.
• What is the name of the number below the fraction bar?
• What does this number represent?
• What is the name of the number above the fraction bar?
• What does this number represent?

A fraction is relative to the size of the whole or unit.
• Is 1/2 of a bar of chocolate always equal to the same amount?
• Why or why not?

A fraction describes division (a/b = a ÷ b, a and b are integers with b ≠ 0), and it can be interpreted on the number line in two ways. For example, 2/3 = 2 ÷ 3. On the number line, 2 ÷ 3 can be interpreted as 2 segments where each is 1/3 of a unit (2 x 1/3) or 1/3 of 2 whole units (1/3 x 2); each is associated with the same point on the number line.
• Which operation is related to fractions?
• How could you write 3/4 as a division sentence?
• How could you represent 3/4 in segments on a number line?

Pizza Predicament

Two school clubs are having pizza parties. For the Jump Rope Club, the sponsor will order 3 pizzas for every 4 students. For the Scrapbook Club, the sponsor will order 5 pizzas for every 8 students. Since you are in member of both clubs, you need to choose which party to attend.

a) How much pizza would you get at each party?

b) If you want to have the most pizza, which party should you attend? Explain.