Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



At Suzie’s Sub Shop, the waitress brings \_\_\_\_\_ submarine sandwiches for \_\_\_\_\_ friends to share so that everyone gets the same amount. How much can each friend have?

(10, 8) (11, 8) (10, 4) (5, 4)

Justify your solution with numbers, pictures, and/or words.

* What standards does this lesson address?
	+ 5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) 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, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*
	+ 5.NF.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?*
	+ For this lesson we are focusing on adding fractions with like denominators (a prerequisite to this standard – necessary to address during this implementation period to address gaps in understanding)
* Why were these number sets chosen for this problem?
	+ The number sets for this problem are (10,8) (11, 8) (10, 4) (5, 4)
	+ Each of these number sets has 4 or 8 friends sharing something. Having 4 or 8 friends allows for answers that are fourths or eighths which are easiest for students to reason about sizes and equivalence.
* What are some expected student strategies and misconceptions? How can I address these strategies and misconceptions in our class discussion?

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| --- | --- | --- |
| **Number Set** | **Possible Student Strategies and Misconceptions** | **Possible Ways to Address Strategies and Misconceptions in Class Discussion** |
| **Strategy 1**(10, 8)8 friends sharing 10 sandwiches |  | This student has correctly cut each sandwich so that all 8 friends receive an equal sized piece from each sandwich.This student has correctly labeled the pieces as 1/8 of a sandwich.\*Make sure a student using this strategy writes a number sentence. If he did not, have the class help him write one.If a student answers 10/8 or “ten eighths” it is OK! Ten eighths or 10/8 is a correct answer to this problem and helps students make a connection between the addition number sentence and the answer. Try to find a student who answered 1 and 2/8 sandwiches and discuss whether or not those answers are the same or different. This will lead to a nice equivalence discussion. |
| **Strategy 2**(10, 8)8 friends sharing 10 sandwiches |  | This student has correctly shared the sandwiches so that each friend receives a whole sandwich and an eighth of each of the remaining two sandwiches. \*Make sure a student using this strategy writes a number sentence. If she did not, have the class help her write one.Make a connection between this strategy and strategy 1. Is the answer 1 and 2/8 sandwiches the same as 10/8 sandwiches? Rather than teaching them how to convert from improper to mixed, have students prove it by reasoning about the picture and the problem context. (Example “I know if you have 8 pieces that are each 1/8 that makes a whole sandwich, so 10/8 would be 1 and 2/8”.) |
| **Number Set** | **Possible Student Strategies and Misconceptions** | **Possible Ways to Address Strategies and Misconceptions in Class Discussion** |
| **Strategy 3**(10, 8)8 friends sharing 10 sandwiches |  | This student has correctly shared the sandwiches so that each friend receives a whole sandwich and one fourth of the remaining two sandwiches. \*Make sure a student using this strategy writes a number sentence. If she did not, have the class help her write one.Make a connections between this strategy and strategy 2. Is the answer 1 and ¼ sandwiches the same as 1 and 2/8 sandwiches? How can we be sure? Rather than teaching them to multiply ¼ by 2/2, have them look to the pictures and context of story to prove that 2/8 of a sandwich is the same as ¼ of a sandwich. This strategy makes for a GREAT equivalence discussion! |
| **Strategy 4**(10, 8)8 friends sharing 10 sandwiches |  | This student understands that the context of this problem is a division problem and has correctly chosen which number is the dividend (10) and which number is the divisor (8).Ask the student to explain her strategy in the context of the problem. You may find that this student has little understanding about why this division works and what her answer really means.If a student answers 1 r 2 – ask “What does “r 2” mean?” and “Does anyone see ‘r 2’ in the other strategies (in the pictures from strategy 1, 2, and 4)?” Try to help the class see that if they give each friend a sandwich, they will have 2 whole sandwiches left over or “remaining”.If this student answers 1 and 2/8 - ask “Where did 2/8 come from?” Look for answers that connect the numbers to the context of the problem (example “they would each get 1/8 of the two left over sandwiches”) and avoid accepting answers that make no connection to the context (example: “I saw the 2 down at the bottom and the eight on the outside so it is 2/8”). If a student gives an explanation that makes no connection to the context, ask questions to him and/or the class to help connect the numbers back to the story and other strategies. |
| **Misconception 1**(10, 8)8 friends sharing 10 sandwiches | Each friend gets ten pieces of sandwich | This student has a similar strategy to strategy 1. The main difference is this student does not know what to call his pieces. While this answer IS correct, it does not help us meet the standard of adding fractions. Ask the student “What size are those pieces” and then challenge this student to write a number sentence to match his thinking (similar to the number sentence in strategy 1) |
| **Misconception 2**(10, 8)8 friends sharing 10 sandwiches |  | This student has correctly determined that each friend will get a fair share (one eighth) of each sandwich, but has a misconception about what those pieces make when put together. This is a very common misconception when adding fractions! If you see this happen in your classroom, be sure that it is shared during your discussion. This student is stating that each friend will get 10/80 of a sandwich which is completely false because he is saying that that each friend will get 1/8 of a pancake. They see 10 pieces out of 80, but ask “what size are those pieces?” so that the student comes to an understanding that each friend gets 10 pieces that are one eighth of a whole sandwich, so 10 eighth pancakes (10/8 or 1 and 2/8). Try to make a connection between this strategy and strategies 1, 2 and 3 above. This student has a nice understanding of equal sharing, but is confused about how to combine fractional parts. |
| All other number choices… | Strategies and misconceptions for these number sets will be similar to those for 8 friends sharing 10 sandwiches.\*With these last number sets, you may find situations where addition of fractions with uncommon denominators is necessary. You may choose to address this in your discussion, or save it for the next week when that is the learning goal. If you chose not to address how to add fractions like ¼ and 1/8 (for example) you can accept “1/4 and 1/8” as a correct answer. |  |
| 8 friends sharing 11 sandwiches | **Possible answers**11/8 or 1 and 3/81 and ¼ and 1/8 |
| 4 friends sharing 10 sandwiches | **Possible answers**10/4 or 2 and 2/42 and 1/2 |
| 4 friends sharing 5 sandwiches | **Possible answers**5/4 or 1 and ¼½ + ½ + ¼  |