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



At a class party, the teacher gave a table of 8 students 6 pizzas to share equally. How much pizza will each student get?

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

Using what you learned from our discussion about the Pizza Party problem, solve these number sentences.

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

|  |  |  |
| --- | --- | --- |
| 1/4 + 1/2 =  | 1/2 + 3/8 =  | 3/4 + 1/8 =  |

* 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 an excellent description about how other teachers have addressed this standard (including classroom discussions and additional problems) see Chapter 2 and Chapter 8 in your book Extending Children’s Mathematics: Fractions and Decimals by Empson and Levi.
* Why were these number sets chosen for this problem?
	+ The number set for the Pizza Party problem is 8 friends sharing 6 pizzas. This number set was chosen because, unless students divide every pizza into eighths, they will be forced to add two fractions with unlike denominators. Since there are 8 people, the fractions that students will be dealing with will be either eighths, fourths, or halves which are the easiest for students to reason about sizes and equivalence (See page 185 in Extending Children’s Mathematics for further explanation of the sequence of these number choices).
	+ Each of the follow up number sentences deals with halves, fourths, and eighths as well for the same reason. Notice, it is only necessary to find an equivalent fraction for one denominator because in each of the number sentences, the denominator of one fraction is a multiple of the other.
* 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 |
| Pizza Party ProblemStrategy 1 | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[1].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[1].jpg | This student has correctly cut each sandwich so that all 8 friends receive a half of a pizza and a fourth of a pizza.\*Make sure a student using this strategy writes a number sentence. If he did not, have the class help him write one (1/2 + 1/4)If a student is stuck at 1/2 + 1/4 and is unsure how much that makes altogther, work as a class to figure out how much pizza each student gets. Use the picture as a reference. \*Misconception – students may say 1/2 + 1/4 = 2/6 make sure to address this by asking “does that match the picture?”  |
| Pizza Party ProblemStrategy 2 | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.IE5\UKQEJY3I\photo[1].JPGC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.IE5\UKQEJY3I\photo[1].JPG | This student has correctly shared the pizza so that each friend receives a half of a pizza and an eighth of the two remaining pizzas.\*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 3/4 of a pizza the same as 6/8 of a pizza? Rather than teaching them to multiply 3/4 by 2/2, have them look to the pictures and context of story to prove that 3/4 of a pizza is the same as 6/8 of a pizza. This makes for a GREAT equivalence discussion! (Example “I see in the picture that 3/4 of a pizza looks the same as 6/8 of a pizza because every fourth is equal to two eights, so if we have 3 fourths then we have 6 eights”.) |
| Pizza Party ProblemStrategy 3 | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[1].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[1].jpg | This student has correctly shared the pizzas so that each friend receives 1/8 of each pizza.\*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 1 and 2. Is the answer 6/8 of a pizza the same as 3/4 of a pizza? How can we be sure? Rather than teaching them to multiply 3/4 by 2/2, have them look to the pictures and context of story to prove that 3/4 of a pizza is the same as 6/8 of a pizza. This makes for a GREAT equivalence discussion! |
| Pizza Party ProblemStrategy 4Misconception | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpg | This student understands that the context of this problem is a division problem but has incorrectly chosen which number is the dividend (8) and which number is the divisor (6). It should be set up so that the dividend is 6 and the divisor is 8. Most students will set this up backwards because it “feels wrong” for the larger number to be the divisor, based on their previous work with division.Ask the student to explain her strategy in the context of the problem. You may find that this student has little understanding about why division would work and what the numbers mean.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. Focus on “Is 1 and 2/6 pizzas a reasonable answer for this problem?” Hopefully the students will see that it is not, because there is not enough pizza for every person to have a whole pizza to him or herself. |
| Pizza Party Follow Up Number Sentences  | The strategies for these number sentences will be similar to those for 3/4 + 1/2.  | The focus of the discussion should be about equivalence and why it is important to replace one fraction with another equivalent fraction.(The goal is not to just hear “because we need a common denominator” – The goal is for the students to understand that to add fractions, every piece needs to be the same size). If this is difficult for students to understand, pose the coin problem in Extending Children’s Mathematics book page 180. |