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

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



6 friends want to share 5 blocks of fudge so that everyone gets the same amount. How much fudge can each friend have?

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

Using what you learned from our discussion about the Fudge for Friends problem, solve these number sentences.

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

|  |  |  |
| --- | --- | --- |
| 1/3 + 1/6 = | 1/3 + 5/12 = | 2/6 + 1/2 = |

* 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 Fudge for Friends problem is 6 friends sharing 5 blocks of fudge. This number set was chosen because, unless students divide every block of fudge into sixths, they will be forced to add two fractions with unlike denominators. Since there are 6 people, the fractions that students will be dealing with will be either halves, thirds, or sixths, which are typically unproblematic for students to reason about size 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, thirds, sixths, and twelfths 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 |
| Fudge for Friends Problem  Strategy 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 shared the fudge so that each friend receives 1/6 of each block of fudge.  \*Make sure a student using this strategy writes a number sentence. If she did not, have the class help her write one.  This will be the easiest strategy as far as combining the pieces because all the pieces of fudge are the same size.  Make a connections between this strategy and the next two strategies once they are shared. |
| Fudge for Friends Problem  Strategy 2 | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[3].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[1].jpg | This student has correctly shared the fudge so that each friend receives a half a block of fudge and 1/6 of the remaining two blocks of fudge.  Make sure a student using this strategy writes a number sentence. If she did not, have the class help her write one.  If the student is stuck at 1/2 + 2/6 and is unsure how much that makes altogther, work as a class to figure out how much fudge each student gets. Use the picture as a reference. (example: I know that it takes 3 pieces that are 1/6 of a block of fudge to make a 1/2 of a block of fudge, so 3/6 is the same as 1/2).  Make a connection between this strategy and strategy 1. Did the students spilt their fudge the same way? (No) Did they get the same answer – do the students in each picture get the same amount of fudge? (Yes) |
| Fudge for Friends Problem  Strategy 3  Misconception | 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 (6) and which number is the divisor (5). It should be set up so that the dividend is 5 and the divisor is 6. 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 1/5 blocks of fudge a reasonable answer for this problem?” Hopefully the students will see that it is not, because there is not enough fudge for every person to have a whole block to him or herself. |
| Fudge for Friends Follow Up Number Sentences  1/3 + 1/6 | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[3].jpg | This student is showing a strong understanding of equivalent fractions.  3/6 is an ok answer! If someone else answers 1/2 reason about whether or not those are the same. Do not worry about teaching simplest form (dividing by the greatest common factor) – instead draw a model of each answer and look for how they are alike. 3/6 will cover the same amount as 1/2 and will be easy for students to see.  \*If a student divides 3/6 by 2/2 to put the answer in simplest form (because they have already been taught the algorithm, ask the student questions to see if she understands WHY that works. Challenge that student to prove her strategy using a picture.  \*If a student says 1/3 + 1/6 = 2/9 pose the coin problem in Extending Children’s Mathematics book page 180. |
| Fudge for Friends Follow Up Number Sentences  1/3 + 5/12  And  2/6 + 1/2 | The strategies for these number sentences will be similar to those for 1/3 + 1/6. | 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. |