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

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

[](http://www.todayifoundout.com/wp-content/uploads/2010/02/snickers1.jp)

Sergio ate 1 and 1/9 candy bars. Lenna ate 1 and 1/3 candy bars. Who ate more? How much did they eat altogether?

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

Using what you learned from our discussion about the Candy Bar Conundrum problem, solve these number sentences.

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

|  |  |  |
| --- | --- | --- |
| 4/5 + 9/20 = | 2 and 2/3 + 8/15 = | 1/24 + 5/6 = |

* 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.)*
  + For an excellent description about how other teachers have addressed this standard (including classroom discussions and additional problems) see Chapter 6 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 Candy Bar Conundrum problem is 1 and 1/9 plus 1 and 1/3. This number set was chosen because, one denominator is a multiple of the other, but more challenging that just twice as much. (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 denominators in which one is a multiple of the other. 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?

|  |  |  |
| --- | --- | --- |
| Number Set | Possible Student Strategies and Misconceptions | Possible Ways to Address Strategies and Misconceptions in Class Discussion |
| Candy Bar Conundrum Problem  Which friend ate more? | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpg | This student has correctly reasoned about the size of these mixed numbers by thinking about how big each unit fraction (1/9 and 1/3) would be.  If a student multiplies 1/3 by 3/3 to find a common denominator, ask the student questions to see if she understands WHY that works. Challenge that student to prove her strategy using a picture.  A student who can look at 1/9 (for example) and reason about its size has a much deeper understanding of fractions than a student who only knows to “find a common denominator. |
| Candy Bar Conundrum Problem  How much candy bar did the friends eat altogether?  Strategy 1 | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpg | This student understands that in order to combine the amount Sergio ate (1 and 1/9) with the amount Lenna ate (1 and 1/3) that she must first have both friends eating the same size pieces. Students must understand how to solve addition problems this way before they can make sense of the algorithm of finding a common denominator. This strategy shows the need for the common denominator – we need the same size pieces.  She sees that if she cuts each of Lenna’s thirds into thirds they will look like Sergio’s pieces. This is the beginning of understanding why multiplying by 3/3 will work. |
| Candy Bar Conundrum Problem  How much candy bar did the friends eat altogether?  Strategy 2 | C:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[2].jpg | While this student has found the correct answer, there may be little or no understanding about fractions behind this work.  If you see this strategy, ask the student questions to see if he understands WHY that works. Challenge that student to prove his strategy using a picture.  Make a connection between this strategy and strategy 1. It looks very different, but they both got the same answer. Where do we see the multiplication of 3/3 in strategy 1? (when the student says “If I cut each of Lenna’s thirds into thirds I will have ninths”). |
| Candy Bar Conundrum Follow Up Problems  4/5 + 9/20 | 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[3].jpgC:\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[3].jpgC:\Documents and Settings\rsmith\Local Settings\Temporary Internet Files\Content.Word\photo[3].jpg | This student is showing a strong understanding of equivalent fractions.  25/20 is an ok answer! If someone else answers 1 and 5/20, reason about whether or not those are the same. Draw a model of each answer and look for how they are alike. 25/20 will show a whole and 5/20 of the next whole. This will be easy for students to see that 1 and 5/20 is the same amount as 25/20.  \*If a student multiplies 4/5 by 4/4 to find a common denominator, ask the student questions to see if she understands WHY that works. Challenge that student to prove her strategy using a picture.  Simplest form is not necessary, but if it comes up, address it the same way you address the equivalence of the mixed number and improper fraction. Students will be able to reason about whether 5/20 is the same as 1/4 if they can use models to explain their thinking.  \*If a student says 4/5 + 9/20 = 13/25, pose the coin problem in Extending Children’s Mathematics book page 180. |
| Candy Bar Conundrum Follow Up Problems  2 and 2/3+8/15  And  1/24 and 5/6 | The strategies for these number sentences will be similar to those for 4/5 + 9/20. | 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. |