Subtraction with Mixed Numbers

Learning goal(s)

- Students will be able to subtract mixed numbers with uncommon denominators, without borrowing from the whole number.

National Standards:

Grades 6-8 Expectations:

Number:
- work flexibly with fractions, decimals, and percents to solve problems

Operations:

- understand the meaning and effects of arithmetic operations with fractions, decimals, and integers

Computation:

- develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results

State Standards:

5.6 The student will
     a) solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers

Prior-Knowledge:
- Students will be able to subtract fractions less than one
- Students will have number sense when comparing whole numbers and fractions
- Students will have number sense when comparing fractions

Anticipate: Try the tasks and solve the problems you plan to use. What strategies do you anticipate your students will use? What are some misconceptions you think your students will have?
- Students may subtract across the denominator , **Why do we need a common denominator?**
- Students may improperly convert fractions,
- Students may confuse whole numbers and fractions (McNamara, 65,) **What is the difference between a rational number and an integer?**

Materials: Cuisenaire Rods, colored pencils, notes sheet, loose leaf paper

The Lesson with Purposeful Questions:
- **Introductory Activity:**
    The introductory activity for this lesson is the first three questions under the warm up section. First, the students will answer the three questions individually. For the first question, the instructor will prompt the students, and a student will be called on to answer. For the second question, students will be directed to discuss the question with a partner. The instructor will call on two groups, and ask the students to explain their definition that they concluded together. For question three, the instructor will call on a student to come to the board and draw a model of the subtraction problem. Followed by the student verbalizing the steps taken in order to solve the problem.

The Lesson Focus:
- o First, the instructor will define a mixed fraction on the board, for all students to copy on to their notes. (**Can someone give me an example of a mixed fraction?) (How would we show that in a picture?)** For question one, the class will be working together to solve the question pictorially. Then, the instructor will demonstrate the problem using Cuisenaire rods. In question two, the students will solve the question individually. After, everyone has tried solving the problem individually, a class discussion will be prompted to solve the problem. **(What rod did you use as your whole?) (Student x, can you tell us how you solved question two?) Student y, can you explain what student x was saying?) (Did anyone else approach the problem differently?)** For question three, the students will be given time to answer the question individually. **(What is different about question 2 and question 3?) (Please raise your hand if you have any questions.)**

- **Wrap-Up**
  - Teacher will prompt students with questions related to the lesson as a review.
    - What is one new thing we learned today?
    - Why do we need a common denominator?
    - If I have two red rods, how many purple rods do I have?

- **Evaluation:**
  - For the evaluation, the students are to get out a sheet of loose leaf paper. They are to explain their approach/blocks used for question three, and what they got as an answer. Then they are to write down if they like using Cuisenaire rods or drawing models more, and why. For question three they are to write down anything they still have questions on or are finding confusing. If time allows, they will be left with a thinking question: Make a prediction about what you would need to do if I was to subtract ¾ from 2 and 1/3.

Resources/Sources:

1.) http://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Principles,-Standards,-and-Expectations/

2.) http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/2016/index.shtml

3.) McNamara, J. (2015). *Beyond invert & multiply: Making sense of fraction computation, grades 3-6: A multimedia professional learning resource*. Sausalito, CA, USA: Math Solutions.

Post-Teaching Reflection:

When reflecting on my lesson as a whole, I think it went really well. I believe that there were many contributing factors that helped it run smoothly. For example, the organization of the worksheet helped for easy transition from the warm up, to notes, and then to examples. This helped save time, and keep students engaged. Then in my warm up, the students had review, but also were challenged when asked, "Why must we obtain a common denominator?" When it was discussed as a class the students had some great points, and I was able to use their examples to help explain my prepared answer. In addition, I liked having student's explain each other's answers. I used this when one student made a pictorial representation of the third problem on the warm up, and then I had Amelia explain the picture. During the lesson itself, I liked introducing the problem by drawing a picture then transitioning to C-rods. Knowing that my class is comfortable with drawing the fractions, I thought

answering the same problem with C-rods may build their confidence in using them. When we went over the question, I also thought I had strong explanations for answering questions and taking the time to explain each fractions and its correlating C-rod. To conclude class, I think the exit ticket is a strong strategy because it helps the instructor have a quick gauge on what students did or did not understand. I would use the same outline for the exit ticket I created again because I like how I could understand where my students were at in context of the lesson, know what kind of learning approach they preferred, and know if the student's had any concerns about the new material that they did not have to ask me directly.

Although my lesson was strong overall, I recognized that a few minor adjustments I could making during the lesson and after reflecting. First, writing definitions on the board takes up class time. If I could find a smoother way for the information to be presented and allocate enough time for students to write their notes, I think I could have had more time for examples. Also, I assumed students would be able to easily define a rational number. However, I think during the lesson I recovered well and had a strong explanation. In addition, I thought I would be able to fit more in in the time allocated. Therefore, I need to work on my time estimation for explanations and examples. Although, I do think that my lesson was flexible enough for students to still understand concepts even though not every example had time to be worked through.

If I had to alter this lesson, I would only make minor adjustments. For example, if I had more time I would want to add in a more challenging problem. Also, I would love to allocate time for a thinking question in order to introduce the next topic. I would want the question to address what the students think about what they would have to do if they needed to borrow from the whole number before subtracting the fraction. Finally, if I had students with different disabilities in my classroom, I would want to make sure that their needs were met so that they could be included in the lesson.

For warm up question two, I was surprised by the little response I received when we were going over the class together. However, I think by using wait time the student's began answering. For example, Ciara used the example that you can not compare apple's and banana's because they are too different. I loved that even though she did not explain the answer in mathematical terms, she used a great example to explain her thinking. I also enjoyed how well Amelia answered when asked to explain another students pictorial representation on the board. I could tell she was not expecting to be called on, but her articulation was strong and it gave me feedback that she understood and was following along with the class pace. When reviewing what a mixed number was the students gave great examples, and responded well to being asked to explain how you would show that fraction with a picture. For example, Jessica said one and a half, and when asked what that would look like she was

able to explain to draw two circles with one completely shaded, and the second circle half shaded. I really liked having preplanned questions because it allowed me to emphasis certain topics that were important, and I was able to expand on them if the class was having a positive reaction.

As a teacher it is important to be able to read your classroom, so that you can meet your student's needs. This comes with preparation but also being flexible during the lesson. From my students' responses during class, I could measure that they had a high level of understanding. As a result, I found myself asking them "why?" a lot to explain their reasoning. In my opinion, this helped challenge the students. However, I realized that my students needed more explanation on vocabulary words such as rational numbers. Then, I could tell some student's got confused with the information written up on the board. This helped me notify me that my writing needs to be big, detailed, and very easy to follow.

After meeting with my instructor, I reworked my lesson in a lot of positive ways. First, I took out unnecessary learning goals. Then, I altered my warm up so that is covered review and introduced topics we would be covering later. After changing a couple of the questions, I also added a key to help guide whoever is teaching. In addition, I altered my national standards to look more formal. Finally, I reviewed my lesson, and added in purposeful questions to make the lesson engaging and encourage academic discussion among my students.