Making Muffins

Objective:
Students will interpret and solve the problem using at least 2 different strategies.
Students will explain and defend their thinking.

Iowa Core Standard:
5.NF.B.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g. by using visual fraction models or equations to represent the problem.

Materials:
- Muffin Problem
- Pens (All thinking is important)
- Problem Solving Language Prompt Sheet
- Sticky Notes (1 for each student)

Opening (5 minutes):
1. Has anyone every helped bake a dessert as home? Have you every doubled a batch before? What happens when you double a batch?
2. Student Purpose Statement: Today we will attack a problem that works with adding, subtracting, and multiplying fractions and mixed numbers. I will know you understand the problem when you do a write up of your thinking describing the problem, your thinking, your "ah ha" and "stuck" moments, your solution, and why it makes sense.
3. Post the problem on the board and give students each a copy of the problem.
   "It takes 2/5 of a cup of flour to make 1 muffin. How many muffins can you make with 35 cups of flour? Come up with two or three strategies to solve this problem."
4. Remind them that all of their thinking is important and to mark their "ah ha" and "stuck" moments.

Problem Solving (35-50 minutes):
5. Students will get 5-10 minutes to work and attack the problem independently.
6. Then students will get 15-20 minutes to work with their group and try to use at least 2-3 language prompts from their Problem Solving Language Prompt Sheet. On a sticky note, students will make a check to show how many prompts each person in their group made.
7. During this time, I will walk around prompting students using the language prompts as well as essential questions such as…
   a. How do we add, subtract, and multiply fractions?
   b. How does multiplying fractions relate to real world problems?
   c. How do you show adding and multiplying fractions in a visual model?
   d. How do you simply fractions?
8. We will then do a whole group share (15-20 minutes) where I will pick out as many different strategies as I can and have those students come share their thinking (ah-ha and stuck moments as well) on the board (reminding the students that if they want to make notes on this part they can because it can be a part of their write up that explains their thinking).
9. Students will share and defend their strategies while their classmates use their language prompts to interact with one another.

Closing (5 minutes):

1. The teacher will then ask the students to share some of their moments where they were stuck and didn't know what to do as well as their "ah ha" moments where something clicked for them.
2. Restatement of Purpose Statement: Today you solved a problem that worked with adding, subtracting, and multiplying fractions and mixed numbers. You will now demonstrate your understanding of the problem by doing a write up of your thinking and the process you took to come to a conclusion. This includes those "Ah Ha" and "Stuck" moments as well as those times you wanted to erase or scribble out something that you wrote down.

Adaption and/or Modifications:

- Students with Special Needs: Make mixed ability groupings to aid students who need extra help and to help students explain their thinking more in depth.
- ELL Students: Highlight 3-4 of the language prompts for those students to look at and focus on.
- Gifted Students: Challenge them to solve the problem in a different way that they think another student may solve the problem if they didn't know how to multiple fractions.
- All Students: Give a brain break about half way through group work time to give the students a chance to attack the problem from a different view.

Assessment:

Formative Assessment- Listen to students and engage in discussion with students during independent, group, and whole class work. The sticky notes will also be used to check on their discussion and hold their peers accountable for the discussion.

Summative Assessment- Students will complete a write up on the problem where they will need to describe their thinking, the problem, their solution, and an explanation for why.

Problem Solving Language Prompts

Questions to Ask Yourself

Understanding the Problem

1. What is the problem asking me to find?
2. What information have I been given?
3. Can I draw a picture of what is happening?
4. Can I think of the problem in another way or context?
5. How can I restate this problem in my own words?
6. Have I seen a similar problem before?
7. What information seems the most important?

Making a Plan

1. What other information can I get from the given information?
    a. What would this other information get me?
2. Do I notice any patterns?
3. Can I think of a simpler version of this problem to make it easier for me to see a pattern?
4. Can I break this problem into smaller parts that are easier to solve?
5. Can I make a graph or chart?
6. Can I use manipulatives or props to help me?
7. What units (if any) am I working with?
8. Have I considered all the given information?
9. What are some other ways might I approach the problem?
10. Did I do all the steps correctly? Is my math computation correct?

Checking Your Answer

1. Does my answer make sense?
2. Does my answer answer the question asked?
3. Does my answer match up with the given information?
4. Can there be more than one answer?
5. Does my answer have the right units?
6. How can I explain my process to my peers?
7. ***If you have extra time, ask yourself: Is there any other ways I could have solved this problem?

Group Conversations

1. I started this problem by…
2. First I….Then I… Finally I….
3. I tried… because…
4. I need clarification on…
5. I think I understand what you are saying. You are saying…
6. I understand what you mean, but I disagree because…
7. My big moment in this problem was when…
8. I was originally thinking this… but then I realized that I could not because…
9. I was stuck when I tried to do… because…

Questions I'm Prepared to Answer

1. How do I know?
2. What makes my answer correct?
3. Is that true for every situation?
4. Why does this make sense?
5. How am I going to defend my answer?