Harvest Dinner

It is once again time for the Warren School's annual Harvest Dinner. We are expecting about 300 people. Our class will be making ratatouille for this special event. The ingredients for the recipe we will be using are listed below. If the ingredients listed are for a serving size of 6 people, how much of each ingredient do we need?

Ratatouille Ingredients (serves 6)

1/3 cup olive oil
3 cloves of garlic
1 1/2 large onions
2 - 3 zucchini
2 green peppers
5 ripe tomatoes
1/4 teaspoon salt
1/2 teaspoon pepper
black olives (optional)

Remember to show all of your work and make it clear how you got your answer.

Bonus: What does all this mean for us on cooking day?

Grade Levels 3 - 5

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Context

Every year my school hosts a harvest dinner for the community. This year my class was making ratatouille for the event. I do a lot of math tasks with my students that pertain to the everyday situations we encounter in our lives, that at first glance do not seem to be "math" problems. Needless to say, the students were shocked at the math involved in making the ratatouille. The numbers and ingredients in this task were very real for the students, causing them to be quite invested in the solution!

What This Task Accomplishes

This task forces the children early in their third and fourth grade years to construct a method for adding fractions and calculating large numbers. Because this task was very real to them and they knew they would be making the ratatouille, completing the task seemed to be purposeful.

This task allowed the children to see the often complex math needed in the seemingly simple task of cooking.

What the Student Will Do

The students did not have an easy time with this task. The first obstacle, and the largest, was figuring out that the recipe needed to be multiplied about 50 times to feed 300 people. Many children multiplied the 300 people by the six servings the recipe served and then got stuck. Once children realized that they wanted to find out how many times they wanted to make the recipe, the next obstacle students encountered was construction of a method for multiplying fractional amounts to determine the amount of each ingredient needed. Most students tended to rely on repeated addition to do so.

Time Required for Task

Two to three, 60 minute periods

Interdisciplinary Links

Many classes and families deal with adjusting recipes when cooking for everyday meals, holiday celebrations, special occasions and big parties. This type of task would work well with any sort of unit that incorporated cooking or making anything which requires a "recipe".

Teaching Tips

I would definitely recommend using a smaller number than 300. For many of my kids I adapted the problem by making the total number of people 50 and in some cases 18. For the students who could handle the large numbers, this problem was a good example how simplifying the task is a great strategy to use in order to figure out what needs to be done to solve the problem.

Suggested Materials

- Lined paper
- Graph paper
- Calculators
- Fraction manipulatives
- Measuring cups
- Spoons

Possible Solutions

When solved purely through mathematics, the recipe in this task needs to be multiplied 50 times. Although none of my students discussed this in their solutions, as a class we discussed the fact that when cooking for 300 people that are going through a large buffet line... you do not need to make the recipe for that many people because some people will not eat it and most will take just a little bit of everything. The original recipe assumes that the ratatouille is the main course.

For specifics on the correct amounts, see the Expert solution that follows.

Benchmark Descriptors

Novice
The student has applied inappropriate concepts and procedures. The strategy of adding the amount needed of each item to the total number of people attending the dinner will not solve the problem. There is no explanation of the solution. The student does use some math language to communicate his/her solution, but much of it is inaccurate.

Apprentice
This student does not complete the task. S/he uses a strategy that is partially useful, but so laborious it could not be completely carried out. This student was adding the recipe's ingredients one at a time starting with eggplants. S/he was going by how many eggplants would be needed to serve six people, then 12, then 18, then 24, etc. The student is unable to create an appropriate representation, but merely boxes off his/her solutions as some sort of organizational strategy.

Practitioner
The student has an understanding of the problem and the major concepts necessary for its solution. Mathematical procedures are used accurately, the reasoning is effective and the strategy leads to a solution. The solution is pretty easy to follow and there is appropriate use of mathematical equations.

Expert
This student shows a deep understanding of the problem and is able to identify the appropriate mathematical concepts necessary for its solution. S/he uses an efficient and fairly sophisticated strategy that leads directly to a solution. This student also includes a clear and effective explanation, a variety of math language and a mathematical representation to communicate his/her solution.