



**VIDEO**

5:00 min

[Full Details and Transcript](#)



## Representing a Problem Visually

Madison Elementary School, Washington  
May 2008

**Topic** IMPROVING MATHEMATICAL PROBLEM SOLVING IN GRADES 4 THROUGH 8

**Practice** PROBLEM-SOLVING INSTRUCTION

- Highlights**
- » Fifth-grade teacher John Corigliano invites student groups to present their solutions to Frank's Fresh Farm Produce problem of deciding whether there is enough gas in the truck's tank before going to pick up produce at two farms.
  - » One group of students explains their visual representation of Frank's trip both as a back-and-forth trip to the two farms and as a loop starting at Frank's produce stand, going to each farm, and returning to the stand. The students compare the mileage for both ways of making the trip.
  - » Another group of students explains using a double-scaled number line model for the fuel gauge to answer the question.
  - » The class considers why Frank might be thinking about this problem.

## About the Site **Madison Elementary School Spokane, Washington**

### Demographics

- » 82% White
- » 6% Hispanic
- » 2% Native American
- » 1% Asian
- » 1% Black
- » 66% Free or Reduced-Price Lunch
- » 30% Special Education

Madison Elementary School “leaves nothing to chance” in math instruction. The staff deliberately reviews all aspects of instruction and has implemented practices and strategies to support students’ math learning, including:

- » A school philosophy of building conceptual understanding, problem solving, and fact fluency;
- » Teaching students to use powerful visual representations to understand and solve problems;
- » Encouraging students to use and compare multiple problem-solving approaches;
- » Using an open number line to teach fractions;
- » Linking mathematical notation to students’ intuitive approaches;
- » Communicating with parents regarding the importance of providing students with positive messages about effort and persistence;
- » Tracking benchmark performance through assessment grids to analyze individual and whole-class reteaching needs; and
- » Using structured protocols to review student work.

## Full Transcript



 **00:04 John Corigliano (to class):** Well, yesterday, we had an opportunity to do some work for a gentleman named Frank and his fresh farm produce. Tell me a few things about what you needed to find out about Frank.

**Student 1**  **00:18** We needed to find out if he could make it to two houses and back to the store without filling up his gas tank before leaving.

**Student 2** He has  $\frac{5}{8}$  of a tank left of gas.

**Student 3** He usually goes to one place and then back to his place. But he found a road that will let him go to one place then to the other place and then back. And he has to find out if he has enough gas to make the trip.

**Corigliano**  **00:46** Today, we're going to see how you solved and labeled your problem.

Well, I wanted to give everybody an opportunity, or as many people as possible, an opportunity to share their thinking. Let's see if you can share your thinking with us about how you came up with a solution to this problem.

**Student 4**  **01:06** At first, he went from his farm to Stan's farm and back, and it was 250 miles. And then he went to Louisa's farm and back, and it was 200 miles. And we added those together and we got 450 miles and  $\frac{9}{12}$  of the gas gauge was used. We think Frank should buy gas before he starts his trip not taking the loop. It seems like we should solve it both ways, like first when he didn't realize that he could use the loop.

**Student 5**  **01:38** After he realizes that he can go from his farm to Stan's farm to Louisa's farm and back to his without backtracking, from his farm to Stan's, that would be  $\frac{5}{12}$  or 125 miles. And then from Stan's farm to Louisa's farm, that would be 120 miles. And then from Louisa's back to Frank's farm, that would be 100 miles. And we added those together and we got 345 miles. So if he used the loop he wouldn't have to fill up on gas.

- Student 6**  **02:16** This is a picture of Frank’s fuel gauge, and each twelfth represents 50 miles. And he had  $\frac{5}{8}$  of a tank of gas, which meant he couldn’t go more than 375 miles. And here, he used 450 miles, which was 75 miles more than he could use. And then he used 345 miles, which is 30 miles less than he could use. If Frank was to use the loop, it would be more efficient and he would use less gas.
- Student 7**  **02:51** We used this number line to figure out some of the mile distance between the farms, like between Frank’s and Stan’s. We knew that it took  $\frac{5}{12}$  to get from Frank’s to Stan’s and back. So we thought if you halved  $\frac{5}{12}$ , it would be the amount he used for just from his place to Stan’s. And half of  $\frac{5}{12}$  is  $\frac{2.5}{12}$ , and we thought that would be, like right here, it would be  $\frac{2}{12}$ , so it would probably be around here, which would be 125 miles. For Stan’s to Louisa’s, well, they already said it was 120 miles.
- Corigliano**  **04:04** What’s different about their strategies just according to their poster? Wendy?
- Student 2** Well, one of the differences that I noticed is that Shayna’s group, they did it without the loop, how much gas he would have to have. And there, they didn’t.
- Corigliano**  **04:19** Why do you suppose they showed us the one without the loop?
- Student 8** Then they would have been able to realize the difference more. People would have been able to see how the difference was.
- Corigliano**  **04:30** Why do you suppose it was important to Frank to have this information?
- Student 4** His main reason for trying to do this would be so in the future he knows how much, maybe, gas it takes to do these trips, to see maybe if he could add another farm onto that or something.