DEBBIE BORDA: I'm Debbie Borda and I'm a math coach for the Jefferson School District.

ANTOINETTE VILLARIN: Hi, I'm Antoinette Villarin and I'm a seventh grade math teacher here at Fernando Rivera Middle School.

DEBBIE BORDA: Today we're going to be doing a number talk with percents with Antoinette's seventh grade students. We've been working on this for probably a couple of months now, for a couple of different reasons. We wanted to do some more number talks with the students because we hadn't done as many this year as we've done in the past. When we started thinking about doing them, we were going to be doing them the month before they took the CST Prep. So we were...I had read from the San Diego Unified School District somewhere that they had done number talks and test prep and so we wanted to try to do that with the students to see if it would make any difference in doing the number talks and the test prep. And if it would help them in taking the assessments.

ANTOINETTE VILLARIN: And we decided that percents would be a good place to start because I had done my percent unit with my class a few months ago and I know on the CST there was a large portion of the test that was focused on percents. So when we were thinking of what we should re-engage and what we should come back to, we were thinking percents would be a good place. And not just naked percents, we want to put it in a context of a real life situation with sales tax and interest and tip and discount. So we kind of went in that direction because on the CST, a lot of the percent problems were also focused on real life word problems like that.

DEBBIE BORDA: And that's actually where we took our structure for the problems we were using. And the word problems are from the release questions from the CST. So we would just modify the names and some of the context a little so that we were preparing them for that type of structure, but also building on what they already knew about percents and extending that knowledge. Because when Antoinette had done the percent unit with them previously, they were doing more of finding the percent of something and they were pretty much using the strategy of friendly percents. So we wanted to see how they would take that prior knowledge and apply it to various contexts and how flexible they would become with the idea of percent. And also developing more than just one method of solving it and the whole relationship between context and naked numbers when trying to find percents. Which is a little bit different than most number talks because most number talks are just putting up equations and not solving it with a context. So this is a little bit different in that we have a context and also after the students share their strategy, we look at multiple choice answers. So do you want to talk about that?

ANTOINETTE VILLARIN: Yeah. So now I think is when we kind of threw the test prep element into this number talk because after the students had a chance to solve the problem mentally and share with each other and share as a class, we would put up four choices very similar to what you would see on a multiple choice test. And we ask students to identify what we call distracter choices and why they were distracter choices. So for example, if C was the answer, we would talk about why A, B and D might be choices that a student might pick by mistake. And that really lent itself to some good discussions in what we've done so far. And we're hoping it would happen this time around when we do this new problem.

DEBBIE BORDA: Yeah, yeah. It was really powerful to see them not only coming up with strategies and making sense of the percents and contexts but then to transfer and look at common errors that other students might make. And anticipating and figuring out why test makers would include those choices on an exam. So that was pretty interesting.

ANTOINETTE VILLARIN: And it addresses the misconceptions that you were talking about. And it would be neat because students would say, "Oh that's how I solved it!" And they realized what they were doing was a mistake.

DEBBIE BORDA: And why it was a mistake.

ANTOINETTE VILLARIN: And why it was a mistake.

DEBBIE BORDA: Which I think was important too. So I think also we were trying to give them a variety of context for percents. So we started with just having one part missing and as students became familiar with that type of context, they almost started having a procedure. So it became automaticity and there wasn't a lot of thinking going on. So every time that procedularizing, if that's a word, started happening we would change the context. So we started with just the part missing and then we went to a changing whole. So there were multiple discounts and so that whole was changing and they had to keep sense of that. And then the last couple that we've done where they had to work backwards to find the whole. So we started with the missing part, then the changing whole, and now the original, or the whole. So that whole part-part whole relationship. It's been really hard; the last couple that we've done because of having them work backwards, which is something that I think not all students are good with it in any mathematical process. Then in a context, I think it was really ramping it up. And I don't know if we selected the best scenarios for that. I think we jumped too quickly to multi-step in finding the whole. So today we're still going to ask them to find the whole but it's not...it's kind of a missing part. They could find the whole but they don't have to. They could just find the missing part that would make up the whole. Right?

ANTOINETTE VILLARIN: Yeah. I agree because there is more than one way to find the answer. In a way that we structured the problem, finding the whole would be one strategy but they could completely find it in a different way. So the problem we're doing today is a real life percent problem where we're taking a student who's shopping for an iPod. And the student is given a percent and the amount that they've paid after the percent. The question that we've

normally given in the past is "How much is the original price before that?" but this time we wanted to ramp it up a little, but also keep it with the same element of that problem. And this time we're asking the students how much was saved. So one strategy we're thinking students might do would be to find the original price and possibly subtract it to find how much was saved or various other ways to do that. It's kind of similar to what we've done but we're changing it in a way that they have to process it a little differently.

DEBBIE BORDA: And I think we're really interested in which method they use. For example, the last couple we've been working where they've been working mentally or working with multi-steps, working backwards, they've been creating mental bar models. And some of them have been looking for the missing part of the whole and some of them have been focusing on the part that we have. So for example, today's problem, we're giving them the dollar amount of fifty-four dollars and we're saying that's forty percent off the original price, "How much money was saved?" So I think we're wondering if kids will focus on that fifty-four equated to sixty percent or if they're going to look at that as forty percent off of something and actually add that forty percent in and take it back off, which is not the most efficient strategy. But we're wondering if they're at that cognitive level where they're doing those extra steps to make sense of what's happening in the context. So we're wondering how students will tackle that part of it. We kind of think they will do a mental bar model in some level as one strategy. We expect some will still do guess and check because it's still new to them, finding the whole. Students have struggled with that and they've fallen back to guess and check when they we unsure on another strategy, which is still hard to do mentally. The whole idea of efficiency isn't really there yet, I think, because they're still making sense of a lot of things. We don't think that they'll create proportions and cross multiplications in their head. I think that is because you had said Antoinette, that you hadn't focused on that yet so if they did it, it wouldn't had been something that they have been taught or if they have remembered it from sixth grade.

ANTOINETTE VILLARIN: Or maybe prior knowledge before seventh grade.

DEBBIE BORDA: But we don't expect them to do that. But it would be interesting if they do something intuitively that's related to that that we're not really sure. Like will they do fifty-four divided by six tenths or fifty-four hundred divided by sixty. So we're not sure if they'll do division or multiplication in that way. I think we were thinking that in this particular problem we don't know how many strategies we'll see. There may not be a whole lot of strategies but we think the discourse will be good. When they've been coming up with answers that are not in agreement with each other in their partnerships, they've had some really good discussions on why their answers agree or don't agree and which one is the correct answer and why.

ANTOINETTE VILLARIN: And I think putting up the distracters too has helped in that discussion because sometimes students see an answer that they had and their partner sees it in a completely different way. And that discussion, where it comes from is pretty valuable with what we've seen so far.

DEBBIE BORDA: I'm sorry.

ANTOINETTE VILLARIN: Oh that's all.

DEBBIE BORDA: The distracters we chose today are based on...and we hope we get to it because it's a short period. But it's based on some common errors that we've seen with the students so far. So one we thought is that they'll just give us what the whole is without the missing part of the whole. So we expect that they might give us ninety dollars. The other common error that we've seen them doing, although they've done less of it is finding the percent of the discounted price. So we anticipated that some students might find forty percent of fifty-four dollars. And the other one is instead of subtracting that missing part like with tax, adding it on if they connect it back to a tax problem, they might add it on. So we're expecting that they could get a hundred twenty-six dollars. Those are some of the answers that we anticipate. I think to start off the problem we're going to ask them before they even start solving it; we'll read it to them so that language isn't such an issue. And have them think about what's happening in this situation, the context and also have them try to connect back to the problems that we've done and make sense of it. "Is this related to anything that we've done so far? How is it the same? How is it different?" And have them have some peer share talk about that before we even ask them to approach the mathematics of the problem.

ANTOINETTE VILLARIN: Yeah, especially if the problem is much different than what we've done in the past. This class that we'll be doing the number talk in is a pre-algebra seventh grade class and there are about thirty-three students. There's a wide range. It's kind of in an upper range of students that scored at a basic level, a proficient and an above proficient level when they were six graders. So in our school district when students score basic or above...or school site, I'm sorry, in our school site if they score basic or above they're placed in a pre-algebra class. So that's pretty much the population of our students. We don't have students in this class that have an IP, however we do have many EL learners in this classroom who maybe struggle with the language but not necessarily all the math content. So I think that'll be an important observation to make as we look at students today. I think that's pretty much it. I don't think I am missing anything.

DEBBIE BORDA: I don't think so either.

ANTOINETTE VILLARIN: Yeah. From what you've seen.

DEBBIE BORDA: Yeah, I think it's really important to have them talk about what's happening in the problem because of the English language learners. And I think a lot of times in number talks they don't do the think per share before they share their strategies in a lot of them. But we do that so that the language learners have that opportunity to rehearse before they speak publicly. Mathematically they can self correct and do those kinds of strategies but I think it's really important for English language learners to have that think time and rehearsal time before we speak to the whole group. So that's part of the reason why we've made it a little bit of a different number talk too.

ANTOINETTE VILLARIN: We added a lot of discourse into it.

DEBBIE BORDA: So we've really been learning this whole process.

ANTOINETTE VILLARIN: And the kinds of problems that we've been choosing. I think maybe the last problem we've chosen the past few times, maybe the language was an issue.

DEBBIE BORDA: And I think the context. I think we were trying to do multiple steps and working backwards but it was too much all at the same time. So it'll be interesting to see what they extract from that and how they can apply it today. I'm really hoping we don't see tons of guess and check but we'll see.