Video Transcript

Questions to consider:

1. What is the math that students are working on? What do students understand about addition?
2. What generalizations are students making? How are students describing and justifying their generalizations?
3. How does their cube model relate to the specific example of 23 + 2? How does the modeling go beyond the specific example?
4. What is the teacher's role in this discussion?

The teacher in this second grade class asked the students to make 25 with two addends. After recording some of their ideas, she asked them to consider something that has come up before…what happens if we change the order of the numbers in addition?

These two numbers that we used, can we switch them around? Can we change the order and still get 25? <Yes> **So how many people think yes? I hear a lot of yeses.** (The majority of students raise their hands.) **Who's not sure? Is anybody not sure about that?** (Two students raise their hands.) **So one person's not sure.**

Boy: Two [are not sure].

Someone who's sure, that they can take two of the numbers that are up here and change the order. I'm wondering how would you explain that? ... Does anyone else have another one they want to talk about?

Ashante: 19+6.

OK, so let's find that one, it's way up here. So if I put the 6 first and then the 19, what will it be?

19+6=25	6+19=25
15+10=25	
20+5=25	
12+13=25	
5+10+10=25	
18+7=25	7+18=25
0+25=25	25+0=25
23+2=25	

Ashante: It will be 25. Because it's going to be the same number because you're just switching the numbers around, you're not adding any more numbers or taking away any numbers, you're just changing them around.

So are you sure that we can do it with all these numbers here?

Ashante: [Nods yes].

You think that if we switch them around, any number that we have here that makes 25, we can switch them around?

Ashante: Yes.

Well suppose that I ask someone in the class here to prove that, could you do something or show me something that could prove it or explain it better to me that it does work? … Here's a question. It's about changing numbers around [puts 23 cubes on the floor; 1 tower of 10 yellow cubes, a tower of 10 red cubes and one tower of 3 red cubes]. **We had the equation 23 and 2 more** [puts out 2 blue cubes] **and someone gave us that equation and said it was 25. So we're wondering if you take the 2 and you put it first and you say 2 plus 23, do you still get 25?** <Yes.>

Amira: It doesn't matter.

It doesn't matter, why?

Amira: Because if you keep on switching it around it would still make 25.[Moves the tower of 2 cubes back and forth from the right of the 23 cubes to the left several times while she speaks]. Cause you're just changing one, you're not taking anything away [takes away the tower of 2 cubes and the tower of 3 cubes] or adding nothing to it [places the tower of 3 cubes to the right of the 2 towers of 10 and the tower of 2 cubes to the left of the 2 towers of 10] so it will still be the same number.

Later in the discussion, the teacher presents some problems with numbers that are too large for these second graders to add up easily.

So I'm going to go back to this one. What if I take the 266 and put that first and then put the 175 second? Let's just take a little survey, how many people think that if I put the 266 first and the 175 second that my answer is still going come out to this 441? How many people think that will happen? (Most students raise their hands.) **Does anyone want to say what they're thinking? And then we are going to move onto something else. Somebody I haven't heard from, Anab?**

Anab: You see the numbers are still going to be the same. The numbers are the same so it's going to be the same answer. [Points to both of the 266's and then both of the 175's as she speaks].

Why don't you use the marker cause I noticed you kind of pointing to things and explain what you meant about the numbers going to be the same?

Anab: [Takes the marker from the teacher]. This number [points to the 266 in the top problem] and this number [points to the 266 in the bottom problem] and this number [points to the 175 in the top problem] and that number [points to the 175 in the bottom problem] are the same so you are going to get the same answer.

So maybe you might draw lines to and kind of match them up to show which numbers are the same.

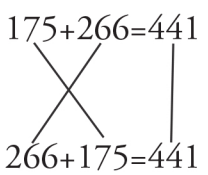
Anab: These two [draws a line between the two 266's] and these two [draws a line between the two 175's].

And so what else is going to be the same?

Anab: This one [points to the two 441's or the sums of each problem].

Alright, so maybe you want to fill that in so you think that the total or the sum is going to be the same.

Anab: [Draws a line between the two 441's].



Boy: You're just switching it around.

Amira: Yeah nothing changes. It's just that the other number goes first.