DAVID FOSTER: The mathematical practices, what were actually the mathematical practices that I think were central to this lesson. And the third is just this idea of re-engagement lesson.

First of all, thank you, Hillary, for teaching this lesson. Thank you, Peta and Jackie and April for being on the planning team. I thought it was great. I thought it surfaced a lot of really great things.

There's five dimensions of true math, and the first one of course is the mathematics. To me, the mathematics of this lesson sort of fell into three categories. One of it was the idea of just using what we call a crosswise table. We use this ... we introduce a crosswise table formally in 8th grade when we start talking about statistics, but this is a crosswise table that helps us do classification. I think just the use of the tool is a really powerful math idea.

The second thing is what this lesson was about, taking geometric shapes and classifying them according to their attributes and multiple attributes. And the third one, which they hit on that was forced sort of on them, even though it wasn't maybe the first one you thought about, was this idea of measurement and precision. It really came in, especially the way that you designed the lesson that it couldn't purely be visual or that you were going to rely on markings to be able to verify them. I though it was really brilliantly done, and it really forced them to ... You can look at kids and they can come up with lots of different ideas that -- no, a student could know that an angle is 180 degrees, so basic things about ... But how do you prove it? You gotta be able to measure it, whether you measure an angle or not. I thought that was really powerful.

The other thing, under the mathematical practices. The first one that sort of jumps out at me that they did was looking for structure. That's what this is all about, is the idea of looking for structure and geometry. But there were two other ones that were really essential, and the first one is the attend to precision, number four, and the second one is five, using a tool strategically, and I think there's room to grow, especially a lot in four and five, as we're working for those. I think that those were really important to do.

In terms of access, I thought there was a lot of access, so re-engagement lesson is built on the idea of access. I think there was lots of really great things, starting from where they were, going back to what they've done before, having physical objects out there. There was a lot of ideas of access. We see that these students in many ways had a lot of agency, identity, authority. Another one of the true dimensions.

The one, though, that I think hit center of all the dimensions we talked about of the true math is cognitive demand. About four years ago, I would go around and talk about things like DOK levels, and everybody would cross their eyes and say, "What's that?" Now that smarter balance is here, everybody's sick of the DOK levels. We all know Van Hiele levels, is the levels of thinking that you have to learn ... that you learn in school. Maturation, getting old, as old as me, doesn't matter, I can still be at level zero.

Just real quick, what those are, because I want to center on this, because I thought this lesson really was about this. At level zero is -- when a student is at level zero, they'll say, "That door is a rectangle." They'll

just think about physical objects without really understanding attributes or anything else. What's a rectangle? The door.

Level one, they start to look at the attributes. The length of sides or the angles or how many sides there are, those kinds of things. At level two is the idea of classifying. Taking different attributes and being able to classify them together. A lot of this stuff was at level two, but level three is informal deductive reasoning. When students are trying to argue or convince somebody else, they are now thinking at that level, which is a really important level that we oftentimes start to work at a lot in middle school. We can work at it earlier, but oftentimes we work at it in middle school because the very next level after that is deductive reasoning, which is all about the geometry we all had to take in high school.

The last level would be high, rigorous levels, which you would do at a college-level geometry course.

What I thought was really interesting was when were the students working sort of at that level two, the classification level, and when they were actually forced to move to that higher level and do that informal deductive reasoning. I thought that there was a lot of really interesting opportunities that you guys have surfaced a lot. Obviously, the disequilibrium that came about when the student thought about the orientation, and then being able to articulate and argue why it should be in one place versus the other was a really nice opportunity.

This idea about precision -- and I know they all had rulers and they talked about the idea of measuring ... I thought it was really powerful when the student said -- first looked at the angle, angle two, and said, "Well, we can find out whether it's obtuse or right or not by actually using this dimension." And then when the debate was, "Should two be down here or up here or should it be scalene or should it be equilateral?" they still used the eyeball test, and what we needed was students to measure it. What I was begging to see is some kid come up and fold that around the line of symmetry to be able to do it.

Not that ... I thought it was really great that you sort of played a poker face on that, but I'm wondering if ... Just saying the words, "I'm wondering if there's a way to prove this?" might be a spark for some student to be able to come up, but that would have been a way to sort of raise and sort of put the idea that measurement needs to be front and center when we make these determinations, because it's really based on the measurements of both the angles and the other angles.