PAM BROUSSEAU: Okay, one of the things we talked about earlier was cognitive demand. So what teacher moves did you do to make that cognitive demand so they weren't out there drowning, [laughs] and at the same time, you were not spoon-feeding them.

MELISSA NIX: Um, it's that dance.

PAM BROUSSEAU: Mm-hmm. [affirmative]

MELISSA NIX: Because, you know, as I went one-on-one, it's kind of tempting to kind of -- I don't want to get in there and just do it for them, so I'm always asking questions back onto them, "So, well, how did you get that?" and "Where did that come from?" and "Can you prove that to me?" and "Is that what your partner agrees with?" And some of those misconceptions were surfaced then one-on-one.

And as a whole group, you know, trying to get them to think about, "Hey, what questions am I gonna ask of this problem?" And, "What might that look like?" Rather than me just saying, "Okay, so now I'm just gonna ask you this question and this is what it's gonna look like," because I'm just telling them. But I -- instead I keep asking them to kind of be engaged with it, and, and think about it, um, think about the mathematics before I even give them the mathematics. Similar with the context of the story, like the Three Read.

PAM BROUSSEAU: Mm-hmm.

MELISSA NIX: Like, I just wanted ... I -- it wasn't quite the best problem to do a Three Read with, because the numbers weren't embedded necessarily in the word problem, it was more in the pictorial. But just that, hey, what is this whole story about, and can we make sense of it before we launch into actually solving it, because if I get too confused by how many rooms there are or sections there are of this carnival, I'm gonna be lost before I even begin.

PAM BROUSSEAU: So, another component of TRU [Teaching for Robust Understanding] is access and equity.

MELISSA NIX: Mm-hmm.

PAM BROUSSEAU: And so really putting that in with -- before that challenge problem.

MELISSA NIX: Yes, because I wanted them to be challenged by the mathematics, not by understanding what the problem was, so I intentionally took the time to do, uh, basically a modified Three Read, so that they could just understand the context, and then understand the problem, and then I intentionally had them highlight, well, what is this problem really asking? You know, so that they could have that access and equity. I didn't want to take the cognitive demand away from them by doing that, but I wanted to give them enough of the structures and supports that they could at least access with what they knew.

So that was a specific teacher move that I did, um, to make sure that they could access the problem but weren't going to be completely lost, like, uh, handing them a worksheet and going

like, "I don't even know where to begin." Like, "I know, we know where to begin. We highlighted what areas we're gonna begin with. Let's start with what you know." So that was intentional.

PAM BROUSSEAU: It also seemed very effective. Very effective.

MELISSA NIX: Yeah.

PAM BROUSSEAU: Also thinking, looking through the lens of cognitive demand ...

MELISSA NIX: Mm-hmm.

PAM BROUSSEAU: ... how do you feel that your lesson sequence and today's lesson design supported them in cognitive demand, being able to move forward with ... ?

MELISSA NIX: Yeah, I mean, we want them to make sense of the mathematical ideas, and we want them to not be lost at sea. I mean, these are some really deep mathematical ideas. And so I want them to kind of play and to have that struggle, but to get somewhere with it. Like I want them to feel like they're doing something right.

And they, they were able to share out some pieces that we're doing right, and as I found student artifacts to prove that, oh, yeah, you -- you're on the right track, you're on the right trajectory ... Yeah, I, I want them to, to make the sense of the reasoning. So today's lesson was kind of sequenced in a way to help them build that sense-making, but then also let them struggle and have some of that productive struggle to say, "Okay, now I need to apply what I've been making sense of in this realm."

I could see how a benefit might be to show them, even in my first couple problems, of like what happens when I multiply a variable times a variable, because that was a sticking point for some of my students. They're like, "What happens when I do an x and a z?" Because I hadn't seen any of those in my pre-- None of my pre-examples had a variable times a variable.

PAM BROUSSEAU: Okay.

MELISSA NIX: Uh, well, my final one -- my area did, the a -- 3a squared and a, but that wasn't owned by everybody, so ... But that said, I kind of liked that they were making sense of it in the moment.

PAM BROUSSEAU: Mm-hmm.

MELISSA NIX: They're like, "Okay, well now what do I do?"

PAM BROUSSEAU: Mm-hmm.

MELISSA NIX: I'm like, "I don't know. What do you do? What do we know that we can rely on?" But I needed to go one-on-one to kind of pull that out of them, um, rather than that whole group, because it was ... that's kind of a deep sense-making. As students were trying that problem on their own, and not making -- not able to figure out what happens when I multiply an x and a y or a 1 and a half x times a 2y, I -- all I could do was on -- in the fly, say like, "Well, what does

happen? What could happen? Why do you think that happens? Show me what that looks like." Um, but I liked that I sent them out to kind of struggle with it.

So I think that that's all that sense-making, all that cognitive demand. I didn't tell them exactly what to do. I wanted them to make sense of it and make sense from one another's. I'm hoping they're all gonna go home tonight and think about dividing out that [laughs], sick of the half *x*.