PAM BROUSSEAU: Melissa, what concept are you going to be teaching today?

MELISSA NIX: So, today we're going to be looking at, uh, area of polynomials. And students have looked a little bit about the exterior dimensions already of an area model, and they've been able to play a little bit with getting the actual dimensions of the area, but this is going to take it one step further in that we're going to be providing the area and have them then try to derive what the two dimensions would be. So, the exterior length and width for example. And there's an added twist to that too that today's lesson is going to be a bit of a challenge because it's going to ask them to do that with multiple variables, so *x* and *y* or *y* and *z*, and an integration of fraction and decimal coefficients. So, they've had some practice already doing some polynomial multiplication, length and width, finding the area, but this is going to be one layer, um, of a challenge more.

PAM BROUSSEAU: So, you're hoping that this is going to solidify the knowledge that they already have and then push them forward?

MELISSA NIX: Yeah. Ultimately, my -- my goal is to then kind of show them how they can use this model to apply to any multiplication of polynomials as well as then factoring, so that they can use their knowledge of this visual to work backward. You know, integrating their previous understanding of the distributive property, which they first learned in 6th grade, worked with again last year in 7th grade, and we've been kind of practicing the last few days. Just reminding them that this is something that they've been exposed to and now we're going to take it that one step further.

PAM BROUSSEAU: So, it sounds like there's some connectedness to it and some connectedness to their prior knowledge and where they're going to move to.

MELISSA NIX: Right.

PAM BROUSSEAU: And, um, can you talk about other connections that you would hope to see them make today?

MELISSA NIX: Well, one of the things I thought about is, um, when planning today's lesson, you know … So, I want to start with a number talk to get them kind of primed. It is an early morning class and they come in somewhat sleepy. So, to get them thinking about mathematics, I'm doing a double-digit multiplication, um, as an opener, but I'm hoping that somebody will show how to do that multiplication problem using the area model. So, breaking it down into partial products and multiplying. And then my second number talk is going to be integrating decimals and fractions just to make sure that they have that as a going into the task at hand …

PAM BROUSSEAU: So, you chose both of these number talks very, very purposefully.

MELISSA NIX: Correct.

PAM BROUSSEAU: And, you're hoping with the double--digit multiplication number talk that someone's going to come up with the area model that will segue nicely into the lesson?

MELISSA NIX: Yeah. One of the, um, possibly misconceptions that I think students might see is when they're trying to multiply the dimensions of my rectangle that they're going to erroneously take the two parts of the length, for example, and multiply them. So, instead of it being like 2*z* and 8, they're going to try to say that that's 16*z* rather than seeing it linearly that they're adding those two, but if we can tie it into that number talk and say, look, you know, when you did a number talk, how did we get, for example, 12 was 10 and 2, you know. What would be the connection there when they're doing the dimensions of the rectangle? So, I'm hoping that that'll tie into their prior knowledge and -- and kind of help support them, or we can reference back to that to -- if somebody gets stuck as a more concrete model for then the algebraic abstract …

And then the second number talk ties in the multiplication of decimals and fractions just to resurrect that skill that can get dusty with middle schoolers. [Laughs.] So.

PAM BROUSSEAU: [Laughs.] Absolutely.

MELISSA NIX: And high schoolers, and adults.