

MIA BULJAN: You introduced this idea of drawing a bar diagram to try and capture our understanding, like of how it's working or what these relationships and numbers are.

ERIKA ISOMURA: Right.

MIA BULJAN: And then, um, tell me about...you're going to use a card sort today, so tell me about, um, sort of how you came up with the cards that you're going to make, and what are the representations that they're going to be matching up.

ERIKA ISOMURA: So...we, um...our two problems are mentor problems. I had two additional problems that were similar, so there's some string problems and then the two next problems were recipe problems.

Same idea of, I want to make this recipe five times and this is the quantity of flour I need, or I was going to make this recipe but I don't...I can only make one fourth because that's just me. And I asked them first to see if the Asia and Alex problems were similar--how structured similarly to either the Jesus or Camila problems, and after...

MIA BULJAN: So Alex and Asia are this sort of recipes that I'm scaling up or down, and then the other ones are the string that they're cutting or putting together?

ERIKA ISOMURA: Right.

MIA BULJAN: Okay, go ahead.

ERIKA ISOMURA: And it took a fair amount of discussion and negotiation, but they were all able to come to an agreement that, "Oh yes, these are the same and these are different."

MIA BULJAN: Right.

ERIKA ISOMURA: And we intro...at that time I introduced the idea of parts and wholes, but I didn't really introduce...I didn't present it.

I said, "So again, Ms. B, Ms. B talked a little about parts and wholes and I'm curious..." And I didn't say anything about what that meant in context. I just said these two terms, parts and wholes, and do we see that anywhere in these problems. And so they agree that, you know, Jesus and...I don't remember--I think it might have been Jesus and Asia.

Their problem we have the parts. We have the seven pieces of string. Those are all of the parts and we're looking to see what the whole amount is. And then Camila, she already has the whole string, so we're taking a part, and we're talking about how much that part is.

And so I said, "Oh okay, that's interesting." So, um, I was thinking when I started setting up the cards, I kind of wanted to have those two types of problems. The "of" problems to them is, "I have a whole amount and I'm taking a part," and the more repeated addition style multiplication...

MIA BULJAN: Equal groups. Yeah.

ERIKA ISOMURA: ...is, "I have a bunch of parts that are all the same, how much would the total of the whole amount of that be?" And so I...

MIA BULJAN: So those are word problems.

ERIKA ISOMURA: They're word problems.

MIA BULJAN: Instead of cards, they're word problems.

ERIKA ISOMURA: And they...so there's a string problem and a ribbon problem. Those are basically the same. I'm hoping that they'll see the connection that it's really not that different.

MIA BULJAN: Dare to dream, Erika.

ERIKA ISOMURA: Yes. And I have a couple of recipe problems and then I basically went to, um, a traditional worksheet and looked for other ones that seemed like they fit one of the two ways we're looking at multiplication with fractions.

MIA BULJAN: Right.

ERIKA ISOMURA: And rewrote them to be numbers that I knew my students have either experienced or numbers that are not scary.

MIA BULJAN: Accessible.

ERIKA ISOMURA: Right. I don't want something like...

MIA BULJAN: Sixteenths?

ERIKA ISOMURA: Right, where the drawing's going to be such a nightmare, and it's going to be all about there's too many things every...you know. So I try to keep the fractions reasonable.

MIA BULJAN: Thirty-seven sixty-ninths.

ERIKA ISOMURA: Right. Yeah. We'll deal with that later--maybe, maybe not. Um, and then I changed all the names, and I made them student names so they all have problems for themselves. So...

MIA BULJAN: That's a nice teacher tip. So you just took a regular curriculum, whatever, like worksheet, and you just pulled out the, um...were there word problems on it or equations?

ERIKA ISOMURA: Mm-hm.

MIA BULJAN: So there were just a bunch of word problems and you just pulled out several and manipulated them to suit your context?

ERIKA ISOMURA: Yes.

MIA BULJAN: Nice.

ERIKA ISOMURA: I changed the names. I changed some of the situations to be ones that have been involved in conversations. So...

MIA BULJAN: You changed numbers you knew they have access to.

ERIKA ISOMURA: Yeah.

MIA BULJAN: Great. Okay, then there's word problems.

ERIKA ISOMURA: And so they got those and then, um... So the first thing was going...I'm thinking of having them kind of sort which one are the "of" problems where I'm taking part of a whole versus the...

MIA BULJAN: Oh, so problem type?

ERIKA ISOMURA: Right. And then the second thing they'll get is some bar models already created where it shows, this is the part I'm trying to find out, you know, might have the full bar to show, "Hey, I only need to know the whole." I'm curious to know...because we have...we've worked with the bar model informally. I introduced it. I threw it out there. We played with it. There's been no real formal instruction on "this is what it should look like when we're done."

MIA BULJAN: Yup. How it works, right?

ERIKA ISOMURA: Right.

MIA BULJAN: Yeah.

ERIKA ISOMURA: It's just been, "here's something that might be helpful. Give it a try. Play with it."

MIA BULJAN: Mm-hm.

ERIKA ISOMURA: So on the second worksheet, it's actually a more formal version of what a bar model would look like.

MIA BULJAN: Mm-hm.

ERIKA ISOMURA: Um, so after they've played with the word problems themselves, then they'll get those and they'll see if they can match up which model seems to represent the quantities and the ideas.

MIA BULJAN: You're using the word problem, which they're very familiar [with], and they have a lot of facility with to sort of back into making sense of this diagram, like...

ERIKA ISOMURA: Yes.

MIA BULJAN: You're counting on them to be able to make sense of these word problems...

ERIKA ISOMURA: Yes.

MIA BULJAN: ...to get this other understanding, right?

ERIKA ISOMURA: To get the diagram, yeah.

MIA BULJAN: Nice!

ERIKA ISOMURA: Yeah, I didn't really...yeah. Again, that...

MIA BULJAN: So you also told me that there are some blank boxes on there.

ERIKA ISOMURA: Yes.

MIA BULJAN: So tell me about that.

ERIKA ISOMURA: So there are a couple of bar diagrams that don't have a matching word problem.

MIA BULJAN: Okay.

ERIKA ISOMURA: And they are things like, um...because again, there are some partner problems. There might be a word problem that wants you to use the numbers two and half.

MIA BULJAN: Mm-hm.

ERIKA ISOMURA: And there's two bar diagrams that have the two and one half. One as an "of," like, "I want half of two," and then one that might be, "I have two one halves."

MIA BULJAN: Got it.

ERIKA ISOMURA: And so I'm curious to see if they really, really understand the difference on how those...

MIA BULJAN: That's a subtle language. Yeah. Yeah.

ERIKA ISOMURA: ...are modeled.