

JESSE RAGENT: I thought it went pretty well. This was, as I said, the first time we had taught this lesson, we hadn't tried it out in our own classroom. We were interested to know what was going to happen. On the very first part, when the groups were sorting just the graphs, and then the class discussion that followed from that, it was pretty clear right away that there was a lot of prior knowledge in the kids about slope and about linear and non-linear, about y-intercepts, and about undefined slopes, which blew me away. My kids, it's very unlikely that they'd be able to talk about that. While at the same time, recognizing that there was a lot of prior knowledge, there was still a lot of confusion and a lot of misunderstandings as well.

It was actually kind of a nice set to go into. They weren't starting at ground zero, but they didn't have it all down either. So it was a nice context to try this lesson in, I think. Um, in the sort of way, that we anticipated, it didn't work out the way that it did when it first um, was it Niall's group? The group that said, "Linear. They're all linear." They showed us quadratics.

TEACHER: Dylan's.

JESSE RAGENT: Dylan's. They gave us all the quadratics. I was thinking about him! He had a good sort in his head, and that group had those graphs categorized. But he had the wrong idea. And then Jake did a great job in bringing out, what does linear mean? "Line" is in there. He maneuvered that really elegantly, but that clarified for me, sort of, yes they know a lot of this vocabulary, but may not know them correctly. And also Luke assumed that, and maybe it was in our direction that wasn't exactly, didn't get what we expected. We thought we'd get, um, "We sorted these, because these are all straight lines, and these are curves." Then we'd try to get more mathematically precise language with those. That's one way to sort it. Now, let's sort them differently. Well, these are all ones that had a negative y-intercept. Then we can rearrange them we didn't do that sort of rearranging on the board. That's one reason we had them on magnets, so that we could move them around, as opposed to just on a posterboard. And say, here are all the linear ones, here's all the... So that didn't go exactly as we thought but I still thought it was okay.

JESSE RAGENT: Once we moved away from that first activity into the matching, and we spent some time prior, Linda and Jake and I, thinking about what the protocol should be. We didn't really want one person to dominate in a group, and we didn't want, we wanted to be fair, and create some equity where everyone would have a turn and have their voices heard. Um, So we had one person talk and other people listen. It became very clear to me pretty early on that the protocol broke down pretty quickly and in some cases that was fine, it was really good that we had the protocol there, because the groups where it broke down was fine The whole group was problem-solving together and having a good discussion. Now I don't think that... it was a lively debate, and interchange of ideas, Which was great. In the ones where it seemed like one person was kind of laying back, Jake or I could come up and say, "Wait, whose turn is it now?" So we could enforce a protocol that we weren't enforcing in other groups, in groups that it wasn't a fair, distribution of, you know, sharing the air. So it was good to have the protocol there, for those groups.

Um, you know, part of our goal was to see if the language that was generated in the whole-class discussion with the sorting of the graphs, Was then going to be used in their justification and in their matching of their sets, their triples of equation, table and graph. And I'm not sure how much of that was going on. I mean, it says in some of these reflections, it seems to indicate that. In some of the groups they indicate that. But a lot of them broke down into, "Let's see, I've got this graph, I see that point's on there, so let's see, is (2,4) on this table? No? Is (2,4) some process of elimination. Um, which, again, is okay, but ah, it didn't really use the language and some of the conceptual connections that we had hoped would be made. But that wasn't universal. I think a lot of kids were saying, "Well, first I see this has a positive slope, so let me look for positive X's." So it was happening somewhat, but um maybe not to the degree that I would have liked to have seen.

JAKE DISSTON: I was right off the bat, as we passed out the equations and many of the groups started writing, I'm sorry, we passed out the graphs and they started writing equations and checking the slope, and I thought, you know, it's gonna be trivial, they're gonna get through this task very quickly. Um, and at the point that Dylan said, "Well, we have this linear group, and all the ones that are linear" and he started naming them, and I was looking at them in my handbook, I couldn't tell if I was making a mistake, all these parabolas. So we put them up, and I checked with him, and at that point I knew, As Jesse said, that it was the perfect place for the lesson. That they had all this background, and yet it wasn't.... you know, they were negotiating meaning, and all this stuff.

So I felt much, I felt good at that point. That was a beautiful way to launch into it. They were very clear about language. A number of kids who were familiar with, you know, who distinguished the horizontal and the vertical line from the other linear equation, linear graphs.

um All of that I thought was, it just made it feel like, um it was well-targeted. I, like Jesse, I thought the protocol... I think that protocols are good, especially when they make themselves obsolete like when you don't need to reinforce it because the group is having a great discussion. The purpose of it is to make sure the discussion is good. If it's getting unproductive, if their discussion gets dominated or if they sort of fall apart, The groups that I was visiting for the most part were having really productive discussions and working well together, and stumbling on things that were right, kind of what we thought they should be stumbling on um when we made the lesson. Which is, how do you. One of our concerns in making this was just the amount of stuff that was out on the tables at once. Would they be able to, you know, we cut the number of equations and tables down from 12 to 8, leaving some out because we thought having 24 pieces of paper would be too much. We downsized some of them we, um but... and so, this was an opportunity for them to, among all this information, start trying to zero in on certain things.

JAKE DISSTON: At what point in the table, what do you look for in the table? What are good points to check? What are the features of the equation that allow you to match them to graphs? Is everybody doing point-matching, or are they paying attention to y-intercept on the equation or y-intercept on the graph. So I thought groups were wrestling with those ideas. And I don't know if this is true, but in looking around, and walking around, I don't think any group raced through and was sitting there with nothing to do um, which is... which is great. In my class, everybody would be done in five minutes and half of them would claim to have finished it and gotten everything, and the other half would have said that same thing but wouldn't have done anything right. They're all racing just to get done. What I was really impressed by was just that there was no race going on. It was purely discussion about things. Which I thought was really neat. So um... and...I thought the 37 minutes, the 38 minutes was just about the right amount of time. Maybe there could have been a sort of processing of the game, um but their reflections seemed very um... they wrote, they described what they learned, how they did it. And so I think we got what we could have in a discussion on paper. So I thought the reflection was... we saved just enough time for them to get some ideas down on the page.