MARGIE TRAINER: What parts of the lesson do you anticipate that your students are going to find straight forward in and be successful?

FRAN DICKINSON: I think what'll come natural to the learners is first of all the number talk. I think we'll probably go through that pretty quickly. And moving into the second phase of the lesson, looking at learner work, I think the similarities and differences will jump out at them right away. Um, I think they'll struggle a little bit with some of the multiple representations. I think...and it's going to be different for all of the different learners in the classroom. So some of them are going to struggle, I think maybe with the verbal description and how to use words to describe the pattern growing. And I think other learners will have more of a challenge with modeling how they see it growing. My hope is that the x, y...I think the in and out table will be easier for them to see the clear connection between the in and the out. But I would anticipate a little bit of a struggle with pulling that T-chart apart and looking at the mathematics behind how the learners see it growing.

MARGIE TRAINER: Will it's sounding like your focus is really on multiple representations and multiple solution strategies, and that's what you're hoping will come out of the lesson for your students today?

FRAN DICKINSON: Yes, I'm really hoping that the learners will take to heart multiple representations for modeling different functions and that we can apply this in future lessons. I've mentioned before that I don't think graphing will necessarily happen today but that is kind of the next step in this lesson, to really dig deep with the graphical representation of both of these rules. And just to kind of have a complete picture of these two different functions that Learner A and Learner B came up with; describing the same pattern and how could we have two different functions to describe one pattern.

MARGIE TRAINER: Can you talk to us a little bit about what your next steps will be after this lesson?

FRAN DICKINSON: My intention is that, um, this is the start of a yearlong study of multiple representations and being able to use multiple representations throughout the year to enhance our understanding of algebraic situations and functions. So I'm really looking forward to exploring in the future the border problem, some tables, problems, and things like that. So just kind of getting into more growth patterns as the year goes on and exploring those representations with those patterns.

STACY EMORY: One of the advantages I see or one of the strengths of this is that when you're going to expand your T-chart and let them show what they're thinking using the numbers; what's the relationship between the input and the output? And then hopefully where they're going to go with this eventually is to start to make some abstractions from their computations; what are they doing over and over in each one of these input/output pairs? And to able to generalize some sort of rule.

FRAN DICKINSON: That's a good point that I didn't really speak to is the generalization piece. I did mention in the learner work that they were fairly successful at being able to generalize. But most of them were generalizing with arithmetic, they weren't generalizing with maybe a variable, you know, making some kind of relationship between y and x. So that would be another outcome that I will be

looking forward to is generating rules that look more traditional and have that y = mx + b format, so that we can start applying that to further graphing lessons, and just building our understanding of algebraic reasoning. Get ready for 7th and 8th grade.

STACY EMORY: One of the strengths of using patterns as an entry point to algebraic thinking is that the kids can start to see the same thing happening over and over, and then trying to come up with the language to describe what's happening. One of the things you said that they were going to struggle with is maybe a verbal explanation of what was going on. And to give them the ability then to move from that verbal to some sort of symbolic representation and to look to be able to describe the function symbolically, or using an algebraic expression, or algebraic equation, it's something that's going to be really powerful for them, and having such a great entry point for them to do that.

MARGIE TRAINER: And I agree wholeheartedly with the idea of making the mathematics explicit by pulling the T-chart apart and representing it numerically to let them make the connection between the input and the output. My question is...do you anticipate that AHA coming from the students as a result of this lesson or maybe further down the road, that the input and output look the same and the graphs look the same, like the way that Student A and Student B solve the pattern was different yet got to the same end result? So maybe, even though the rules, if they get to that point, look different, the rules are equivalent, is that an anticipated...?

FRAN DICKINSON: That's an anticipated outcome, so yes and no to the question. I think yes I want them to see the mathematics behind the pull-apart and that's where I'm going to focus today. I don't know that they'll see the equivalency and the graphing because that's something that will be hit or miss as to whether learners will get there today. But is definitely where I'm heading; I want them to make that leap. And um, I don't know at this point in the school year that yes, we'll get to looking at the equivalency between two different rules, but I do anticipate that eventually somewhere down the road we'll get there.

MARGIE TRAINER: Fran, thank you so much for letting us come into your class and watch this lesson.

FRAN DICKINSON: My pleasure.