Growing Dots 1 Lesson, Period 4

That's how we got 400, cause she said multiply 10, I mean 100 times 4, cause 4 was what we were using.

00:15:32 Kirk: All right, can I get your attention for just a moment please? Um,

00:15:36 Kirk: The first part of the question says describe the pattern. And we talked about, someone said it looks like an X pattern. I've also heard people tossing around, you add four to each one, different things like that.

00:15:49 Kirk: The second part of that question says, assuming the sequence continues how many dots are there at 100 minutes? Can I get somebody to share with the class what they got for 100 minutes and how you arrived at your answer?

00:16:01 Kirk: Danielle?

00:16:01 Danielle: Four hundred and one.

00:16:02 Kirk: Okay, she says 401. Anybody else agree with that?

00:16:05 James: Agree?

00:16:07 Kirk: Can you explain how you arrived at 401?

00:16:09 Danielle: Because I got the equation x times four plus one. The plus one being the center, umm x being the dots around it or 100 and four being all the dots except the center.

00:16:21 Kirk: Okay. Can you illustrate that with that little diagram there?
Conceptualizing and Representing Linear Relationships
Session One
Conceptualizing and Representing Linear Relationships is designed to focus on the mathematics used in teaching linear relationships.

Specifically teachers consider the issues of:

- Developing an understanding of students’ conceptions of linear relationships
- Preparing and enacting tasks to enable students to develop conceptual understanding of linear relationships
  - Conceptualizing and representing slope and y-intercept
  - Recognizing, distinguishing, and relating closed and recursive ways of thinking and representing linear relationships
Each case is optimally designed for three hours and typically contains:

- Situating the Work—connecting to literature, research, etc.
- Doing Math—exploring the mathematics of the lesson
- Viewing/Discussing Video—examining authentic mathematics teaching situations
- Linking to Practice—bridging between the work in sessions and teachers’ own practice
- Compare and Contrast—comparing and contrasting video segments, mathematics, and student approaches

A module links a series of video cases together into a coherent professional development curriculum.
Intent of These Materials

• These videos are not intended as models or exemplars, but rather as instances of practice to study and analyze.

  [Teachers portrayed in the videos are individuals who acknowledge their own challenges as they struggle to improve their teaching in order that their students understand mathematics.]

• Designed to study teaching and the mathematics used in teaching over the course of a series of coherent and connected experiences.
Working Hypotheses: Using video of teaching affords the opportunity for teachers to . . .

• **Build a language of practice** to communicate, reason, and talk with precision about teaching.

• **Develop habits** of inquiring into practice, envisioning alternatives, and extracting from complexity.

• **Deepen content knowledge** used in the practice of teaching, such as:
  – Keeping one’s eye on the mathematical trajectory (mathematical learning goals)
  – Choosing and using various representations of mathematics to further students’ learning
  – Making whole-class discussions opportunities for all students’ learning
  – Launching a lesson
  – Interpreting and responding to perceived student errors and unexpected student methods
Teaching is a practice that can be learned—like playing soccer or performing dance.

Teaching is complex. In complex practices there are many variables at play; there are no simple solutions; some things are unpredictable.

Teaching and learning happen within a basic set of dynamic relationships—teachers, students, content, and environment.
Teaching and Learning

Ball and Cohen (2000)
### Foundation Module Map

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**We are here**
What has gone well and what are some of the challenges you’ve encountered in teaching students to build rules from linear patterns?
Growing Dots 1 Lesson Task

At the beginning

At one minute

At two minutes

Describe the pattern. Assuming the sequence continues in the same way, how many dots are there at 3 minutes? 100 minutes? \( t \) minutes?
Mathematical Task Questions

• Look over your notes from solving this problem. Why did it make sense to you to solve it this way?

• What are some of the ways students might solve it? What misconceptions might they bring?

• What might a teacher need to do to prepare to use this task with students?
Lesson Graph Questions

• What does this lesson graph tell you/not tell you about the mathematical point of the lesson?

• What clues (evidence) are you using from the lesson graph to make this claim?
• What moments or interchanges appear to be interesting/important mathematically?
• What about them makes this so?
Linking to Practice
Reflections

• What were the important mathematics ideas you encountered today?
• Did this experience generate any insights/connections related to teaching? (What about the day prompted these?)