ANTOINETTE VILLARIN: Okay, so what I'm going to do now is I'm going to highlight -- because I think this is the perfect time to talk about language. Okay? And a couple of you that's asked to share have started to talk about these things. Elias talked a little bit about the starting situation, okay? And what was the starting situation that Elias said?

STUDENTS: Five.

ANTOINETTE VILLARIN: Five. So we have a starting situation, our initial value of five centimeters. That means in this bottle if I look at it, there's how much liquid here in the top when I'm starting at zero seconds? If my starting...if my starting height is five centimeters, what does that mean in this bottle? Turn and talk to your partner. Turn and talk to your partner. What does that mean if my starting solution...oh sorry, situation...I'm sorry...that Elias talked about is five, what does that mean about our container? Okay? What does that mean about our container? Turn and talk to your partner. Partner A go first. Partner A go first.

STUDENT: I’m starting, right? Each second… so each second it's just going down one inch…

STUDENT: Well, with the five it means that there's already one centimeter that's gone into the bottom prism.

ANTOINETTE VILLARIN: Okay, is there a volunteer that could share with the class, what that starting situation of five centimeters means? Kaymyn?

STUDENT: I think that means that all the liquid is, like, on top of it.

ANTOINETTE VILLARIN: Okay, all of it? Okay, tell me why.

STUDENT: Because you start off with five.

ANTOINETTE VILLARIN: Okay, you start off with five. So you think there's five here?

STUDENT: Yeah.

ANTOINETTE VILLARIN: Do you remember at the beginning when we were talking about constraints?

STUDENT: Yeah.

ANTOINETTE VILLARIN: Do you remember what we said for this lesson our constraint would be, for how much liquid would be in here?

STUDENT: Six.

ANTOINETTE VILLARIN: It'd be six. Okay, if I have five here -- still remembering that constraint -- what do we know is going to be down here?

STUDENTS: One.

ANTOINETTE VILLARIN: One. So it's almost like we're capturing the liquid flowing in time, and we've taken a really quick snapshot of it. And in this graph when we started, we have five centimeters on top and we have one on the bottom. Okay, does everybody get that? And that's what we call our starting situation.

Okay? So up here, that's the sentence...that's the language -- sentence frame that you might want to use when you start to describe your own graphs later today. Okay? Elias talked a little about it and I encourage all of you to do the same. Okay? All right, we're now going to talk about something called rate of change. Okay? So we said at zero...at five seconds, right? How...what's the height of the liquid?

STUDENTS: Zero.

ANTOINETTE VILLARIN: Zero. Okay, so here's another sentence frame that you might want to use. "At zero seconds, the height of the liquid is..." Oh, I'm sorry. "At five seconds, the height of the liquid is zero centimeters." That means in five seconds, what happens to all of this liquid?

STUDENTS: It goes to the bottom.

ANTOINETTE VILLARIN: It went down to the bottle and it's now empty. Okay and all the liquid is down here in the bottom. Is everybody understanding that situation? Okay. And then I'm going to go down to here: "I know the rate of change is..." And what did Veonna say it was?

STUDENTS: One.

ANTOINETTE VILLARIN: Oh, I'm sorry. Let's raise our hands, okay? What was it? What was the rate of change, other than Veonna? Cecilia?

STUDENT: One centimeter over one second.

ANTOINETTE VILLARIN: One centimeter per second. Okay? So the rate of change is going down one centimeter per second. And we know that because on my graph that looks like it's the slope. Okay? Now I want you to turn and talk to your partner. Do you think that rate is constant throughout the whole graph? Is that constant throughout the whole graph? Turn and talk to your partner.

STUDENT: It's one centimeter per second and it's going to keep going like that.

STUDENT: Well, I think it's constant because...it’s thinking of a [inaudible] because it's going up once, and it's going horizontal.

STUDENT: Yeah.

STUDENT: So five centimeters at one second...

STUDENT: At one centimeter.

STUDENT: At one second it goes down one centimeter and then it keeps going. Yeah.

STUDENT: At one centimeter it goes down at...at one second, it goes down one centimeter. Two seconds, two centimeters. Every second it goes down one centimeter.

STUDENT: As the centimeters is going down, the time is going up, and if the time...never mind. What I meant was it's constant because it's a straight line, and it's going up and down.

ANTOINETTE VILLARIN: Who can tell the class what they think about this line...or that rate -- one centimeter for every second? Is it constant throughout this whole graph? Okay, Kaymyn?

STUDENT: I believe it is constant because if there's five centimeters of water and if it's all gone in five seconds, then it's one centimeter per second.

ANTOINETTE VILLARIN: It's one centimeter per second? So if you look at that and if you look at the ending point, so the starting point and ending point, you're saying that in five seconds that it's gone down five centimeters. So you believe it's one centimeter per second.

Okay, is there anything else in this graph that tells you it's constant? And *constant* means it just stays the same. Your rate is staying the same. Just like if I were walking and I'm walking at a constant rate, it means I'm staying the same. If I accelerate then it's not constant. Okay? So I'm asking you, is this constant in that it's flowing out at the same rate? When you look at that, what tells you that it might be? Raise your hand. Cecilia?

STUDENT: The slope.

ANTOINETTE VILLARIN: Okay, the slope. And what do you know about the slope?

STUDENT: It's one centimeter over one second.

ANTOINETTE VILLARIN: Okay and is it always one centimeter over one second?

STUDENT: Yeah.

ANTOINETTE VILLARIN: Yeah, it's always one centimeter. Okay, what else about this graph that tells you that it's constant? Josan?

STUDENT: The line is straight.

ANTOINETTE VILLARIN: The line is straight. Okay. When you have a straight line and it's linear, it's telling you it's moving at a constant rate. A constant speed, a constant rate. Okay? Does everybody get that? Okay, so we're going to move along.