JAKE DISSTON:

JESSE RAGENT:

STUDENTS:
JAKE DISSTON: Ok, people have already started doing this which I'm really excited to see. What we'd like you to do is actually move them around and put them in groups. And they can be groups that you see commonality between. So what we what you to do is to organize the graphs into groups, 00:14 create as many different groupings as you can and then be able to describe, come up with language to describe each group. All right? And I'll stop you in about five minutes to talk.
STUDENTS: [Chatter]
STUDENT: Wait, do we have to find the equation?
STUDENT: Just start like…this one goes with that one.
STUDENTS: [Chatter] This is like both.
STUDENT: This is too.
STUDENT: Not necessarily. Not that one. Positive.
STUDENT: These are just the X, or just the Y's.
STUDENTS: [Chatter]
STUDENT: I feel kind of left out.
STUDENT: There's one that starts at negative four maybe you compare those.
STUDENT: If they're the same but going separate ways it's a parallelogram.
STUDENT: Yeah. Yeah. Because this is like positive four and this is negative four.
STUDENT: So we are trying to make as many groups as we can, right?
JAKE DISSTON: Very good things.
JESSE RAGENT: Before he goes off, I've just got to say I'm so impressed both with the quality of the students but the hair. (laughter)
STUDENT: Thank you.
JAKE DISSTON: I heard it was crazy hair day too.
STUDENT: You caught us on our best day. You should see us tomorrow.
JAKE DISSTON: What's tomorrow?
STUDENTS: [Chatter]
JAKE DISSTON: The whole shebang? No holds barred?
JAKE DISSTON: So here's what we want to do. What we'd like to do is hear some of what you guys noticed, what you thought was… what stood out about these graphs. What are the things that you noticed? And I have these slightly larger copies and we will sort of get a sense so the whole class can see what different things you paid attention to. So do you want to start over here?
STUDENT: Ah yeah. So for Jeff, we made a group of linear equation graphs.
JAKE DISSTON: O.K.
STUDENT: And for Sarah we had positive graphs.
03:50 So hold on one sec. So let me…and how did you determine linear? Let's call it linear. Give me some of the ones that are in linear.
STUDENT: So we have a Y equals minus X.
JAKE DISSTON: Just give me the graph numbers.
STUDENT: G9. G5. G12 and G11
JAKE DISSTON: So G9, G7, G5, G12
STUDENT: No not seven.
JAKE DISSTON: Oh. O.K. and what did you give this name?
STUDENT: Linear equation graphs.
JAKE DISSTON:Linear equation graphs. O.K. Great. And why did you call them that?
STUDENT: Well, we call these…basically equation graphs…well linear equation graphs because you find the points by an equation

so say for G9 you have the equation Y=-X squared. So you could use X and find the points on a graph.
JAKE DISSTON: What do you guys think? Good? So we are talking about equations. Do you guys…So he used this word linear, how many people know what linear means?
STUDENT: Well, sort of.
JAKE DISSTON: So what does it mean? We call things linear equations or linear graphs. Yeah.
STUDENT: I think it has to do with order and being in order.
JAKE DISSTON: Tell me more.
STUDENT: Just so if you have Y=X squared or negative X squared then you would plug in one for X, two for X, three for X…
JAKE DISSTON: O.K. so I'll go to what you said Y=X squared. You'd plug in values. Do you have a way of organizing that?
STUDENT: Yes, so you would put Y=1 squared. One squared equals one.
JAKE DISSTON: And I heard somebody say T-chart, is T-chart familiar? Yes. So a table or a T-chart you have something like this. You'd say X=1 so Y=1.
JAKE DISSTON: X equals 2, Y equals 4 ex-cetera. And so on and so on. I see the equation and I see the relationship between X and Y but I want to go back to this because you called it linear. Yeah.
STUDENT: So linear basically means lines, right?
JAKE DISSTON: So does everybody…would that make sense? That linear would mean lines? Why?
STUDENT: Because it has the word line in it?
JAKE DISSTON: Yeah. Because it has got the word line in there. Line. And what's the opposite of linear?
STUDENT: Non-linear?
JAKE DISSTON: Say it. Loud.
STUDENT: Non-linear?
JAKE DISSTON: Which would mean non…so what's something that's not a line?
STUDENT: A parabola?
JAKE DISSTON: A parabola. A curve. So what do we have up here?
STUDENT: Parabolas.
JAKE DISSTON: So these are actually…
STUDENT: Parabolas.
JAKE DISSTON: Parabolas, which are non-linear. O.K. So we made a mistake. Here let's put this. Alright so…and they can be formed by using equations and tables ex-cetera. Great, alright.
JESSE RAGENT: Do we have an eraser?
JAKE DISSTON: Yep. Alright, Can I hear from a different group about a different grouping? Ah so let's go to Sam. What did you guys pull out?
STUDENT: We had undefined in a pile.
- $. (' , 6 6 7 2 1 And tell me what you mean by…ones first of all so we can get them up…
STUDENT: G1.
- $. (' , 6 6 7 2 1 G1 and G1, O.K.
STUDENT: Undefined.
- $. (' , 6 6 7 2 1 So tell me about undefined.
STUDENT: Because it has no rise or runs so it doesn't move.
- $. (' , 6 6 7 2 1 So no rise and run…What that people of undefined? No rise and run. Somehow different than… we actually don't have the linear ones up But I assume that, Dylan, that if you pulled out non-linear than the other were linear. And does this fit? Where does this fit? This G1.
STUDENT: It fits with the undefined…well it's a line so it would be in the linear group.
- $. (' , 6 6 7 2 1 O.K. So… O.K.

JESSE RAGENT: So what's undefined? The whole line is undefined? Or… Yeah.
08:17 The slope is undefined.
08:18 Yeah. There's no slope.
JESSE RAGENT: Because you talked about rise and run or something.
08:20 Yeah.
JESSE RAGENT: So can I write slope undefined?
08:27 Yeah.
JAKE DISSTON: Great. And did anybody else find another one that fit that same category? Slope undefined? So the G1 was the only one with slope undefined?
08:38 G4
JAKE DISSTON: G4
08:43 That's zero.
JAKE DISSTON: I think everybody agrees with you.
08:46 Opposite day!
JAKE DISSTON: Opposite day! So is G4 undefined?
08:52 No.
JAKE DISSTON: Why?
08:58 So, it does have a run, so to speak, it goes across but I don't have to go up at all. And this has a rise but I don't go over,
JAKE DISSTON: So yeah that idea of why this is defined, and this isn't defined, is kind of an interesting thing to think about. Maybe we will come back to that. So let's hold that out because that doesn't…we are going to say that doesn't fit there. Any other categories that people came up with? Yes.
09:22 Linear equations.
JAKE DISSTON: Linear equations. And give me a couple that fit with…
09:29 G8, G3, G10, G6, G2, and G7.
JAKE DISSTON: and what, all the other ones?
Yeah just the only ones that were left.
JAKE DISSTON: Alright, so, we've got some linear equations and again, linear means…line.So, have we put them all up? The twelve? Now that doesn't mean that is the only way you could have sorted them, right?10:03 Did people come up with other categories besides the three that we have? Slope undefined, non-linear, linear. Neil?
10:10 We came up with a positive linear, like, positive and negative graphs.
JAKE DISSTON: O.K. Do you have a linear? Cool. We are running out of magnets but that's O.K. And then within here you had positive and negative as ways to, sort of, separate. O.K.? Any other sub-categories? Yeah.
10:39 The same Y intercept?
JAKE DISSTON: Same Y intercept. Tell me about that.
10:44 I have three groups here of Y-intercepts. In this one I have two on negative four and one on positive four.
JAKE DISSTON: O.K. Give me…
10:56 G2, G8 and G7.
JAKE DISSTON: O.K. so G2 has a Y intercept of
positive four.
JAKE DISSTON: Positive four. And you saw other ones that had a Y intercept of positive four?
11:09 Negative four. Both the other ones, negative four.
JAKE DISSTON: Ah, got it. So you had positive four and negative four and…
11:14 Negative four.
JAKE DISSTON:O.K. Alright. Got it. So we can divide those into different Y-intercepts. Alright?
11:25 And then this one, the Y-intercepts are all on zero.
JAKE DISSTON: Got it. So we have ones like this one and this one and this one, G6, which have Y-intercepts of zero.

11:35 Yeah. G6, G3 and G10.
JAKE DISSTON: O.K. Great. Any other things people noticed to help sort or to group these? We've got, sort of, Y-intercept, positive slope, negative slope, linear, non-linear, slope undefined. Yeah.
11:50 Zero. A zero slope.
JAKE DISSTON: And a zero slope so among the linear there is positive slope, negative slope and zero slope.
JAKE DISSTON: Excellent. Which doesn't fit either positive or negative.
12:05 Yeah.
JAKE DISSTON: O.K. Alright. Good.
12:09 You guys are so impressive. I wish I had you for my class.