

00:00 First of all, Joe, I'd really like to thank you for letting us into the classroom. That was so fun. So amazing.

00:08 It went very, very well. So why don't you just sort of tell us how you felt about the lesson, what you thought was going on?

00:22 All the way through, I was a little taken aback at the level of participation, which was really high.

00:30 The confidence, whether it was misguided, which very few of them were, there were a lot of very confident math students in a class that is a typical math class.

00:42 We don't track here, so it's a heterogeneous 6th grade math class.

00:48 So from the first web of, tell me about—give me some examples of rates, to comparing rates, based on unit rate or based on holding a denominator and numerator constant,

01:02 They were—they were on it! They were participating, and discussing, so I was really happy with .... What they were able to do.

01:13 You were saying you were really happy about what the one girl in the front said—can you speak to that? Sort of at the end of the lesson? 01:22 Edwina?

01:23 Yeah.

01:24 She had—she had said that ... given a particular rate, I think it was, say, steps per second, there would be one winner,

01:44 and if you switched the rate around to seconds per step, there'd be a different winner.

01:48 And so this opened up a really great conversation in class about—about what that meant! What does steps per second mean,

01:57 And what does seconds per step mean? And so we had people up doing that. You know, what does it mean to have 20 seconds per step,

02:05 What does it mean to have 20 steps per second.

02:09 So what she had done there, everyone understood, and understood how it could be misconstrued.

02:16 And I loved how you asked the kids to get up and demonstrate what those different rates would look like.

02:23 To me, I was sort of blown away when the one boy at the front of the room (sorry, I don't know any names)

02:32 Didn't feel constrained to use the numbers in the problem to make a point about which was the better rate and why those rates were really different.

02:41 And why you didn't want to win. That is such a nice piece of thinking, that you don't really have to use the numbers in the problem to distinguish between the two rates.

02:53 I thought that was very sophisticated. I really liked that.

02:57 So, Becca, what were some of your observations about the lesson?

03:01 I guess, something that struck me was – we talked about looking for units, and this acknowledgement of these two measurements.

03:10 Steps per second, beans per second. And I noticed cases, sort of a 'flexible use' of how students referred to their units.

03:22 So in one case, the student who's sitting in the back of the room, Omar, he didn't put any units down in his student work next to his ratio.

03:33 But he was able to explain in words exactly what he was talking about. So he did have the idea of those two measurements in his head

03:42 Though we still weren't seeing what the teacher, the classroom we want to see, of all of the units written down nice and neatly.

03:51 It also stood out to me that in conversations, the big ideas that came out, that Emily brought up and that we came back to at the end,

04:00 With the question posed by Edwina, is: when do we want, in the case of beans per second, when do we want more beans? Because that makes us faster?

04:10 Or the idea that we want fewer seconds. And that also makes us faster. There's still so much more to explore there,

04:20 But this growth, and just to remind myself and ourselves of the growth we've seen, because they're talking about those units.

04:26 And we're seeing that flexibility growing. That really stood out to me.

04:33 One of the two boys near the front of the room, you called on him and he wasn't very articulate, but his paper was really brilliant.

04:40 Because he came up with sort of a reverse unit rate of one bean per amount of time. Whereas we normally think of the unit in the, with the "per one second."

04:52 One minute, or something, being in the bottom. So that was really interesting.

04:57 There was a little girl, Chrissy, who I did follow, and she could always set up the first rate correctly, and then when she did the second ones,

05:11 She kept the labels the same but she reversed the numbers, like she had this idea but she couldn't quite follow the pattern for all three people each time.

05:19 Mm hmm.

05:20 Which was really interesting, and it's because—I would have liked to have probed her thinking, because she only put one of the labels.

05:27 She only put the seconds, and she never labeled the beans. As we did all the problems, the seconds seemed to be the only piece of the rate that made sense to her.

05:39 And the beans were irrelevant to sort of what the units were.

05:44 So it's just intriguing how much there is to think about when you put something together that complex, and making that comparison.

05:51 There was a couple rates, oh yeah. So, they had begun to compare the rates for Alex, Sarah, and Joe.

05:59 And the first person who gave the rate, gave it as seconds over beans, and then the other two gave it as beans over seconds.

06:08 And they were still able to identify the terms, like, okay, all these terms are the same, but the order in which I say them

06:17 It didn't seem to concern any of them that they were...

06:21 Yeah, I kept expecting somebody to stand up and protest, or, you know, "We need to make them the same!"

06:28 Looking at their problem of the month posters, in Level B is a comparison where they are asked to keep one of the constraints constant, it's a yards/ second.

06:37 They were asked to figure out and make a comparison between two runners, each -- they're given rates that are not for 30 yards,

06:46 And they had to do some calculations and say, "So who would win a 30-yard race?"

06:50 And what we found in that, and we can take a look at the student work afterwards,

06:55 Is that one of the posters, one of the groups, decided to put the 30 yards in the numerator and make a comparison,

07:01 One of the groups put the 30 yards in the denominator and make a comparison,

07:05 And then fascinating enough, the third group did one of each.

07:10 And they all came up with a correct conclusion, of who was fastest.

07:16 So we did actually see that student work, or this idea in their student work, and one of the ideas in this reengagement was to use that student work

07:26 Instead of the naked numbers, sort of, that we chose at the end.

07:31 Nice things that I was really paying attention to as we worked them, is that a lot of students could take and figure out the answers using mental math,

07:42 So they would do all the manipulations, maybe change the rates from what's given to what they considered a better rate, but they would do it in their head

07:52 So I'm wondering how much mental math do you work with on kids, or is this just part of your philosophy of getting them to be really flexible?

08:04 Like in a normal classroom I would have expected more kids to have had to do it all manually, but it was really nice to see...

08:13 Mm hm. Yeah, you know, we start off, I start off the year doing number talks, number of the day, every day. Five days a week.

08:27 Just like a Tribes circle, or anything, creating that culture in the class,

08:33 You know, it trails off. But by the end of the year we're still doing one or two a week.

08:38 Mm hmm.

08:39 Where they're asked to, you know, solve these problems in their head, and how they got to where, how they got their solutions.

08:49 And this is also where that culture of multiple representations kind of begins, is having five or six solutions to a problem on the board

09:00 And having a student choose one of the solutions, that wasn't their own, and write that in their math journal as an example of how to solve this particular problem.

09:09 So they're not only looking at three or four different solutions, but they're choosing a solution that wasn't their first, intuitive to them, it wasn't their first choice

09:20 And copying that down as a possible way to do it next time.

09:25 Yes. To clarify, and that's typically a mental math problem. Even though you do the writing. They write that down to sort of remember the steps.

09:33 Right, at the very end. Right.