00:00 Flip your paper. Make sure you have a good space. I want you to use these methods you showed incredible mastery of.

00:15 The idea that seconds, number of seconds, if all equal, we could look at the beans and determine a winner.

00:25 Or if we had the beans, if they are all equal, we could look at the seconds and determine a winner and I have to point out Emily's great statement.

00:33 It says, "In seconds per bean we want less seconds." And in beans per second we want more beans.

00:40 So now I'd like you to look at this.

00:48 So here's new data comparing steps, remember Mr. Condon running back and forth? And time. It wasn't funny.

01:00 So Joe takes sixteen steps in ten seconds. Sarah takes thirty-two steps in twenty seconds and in fifteen seconds, Alex again, walks twenty-one steps.

01:17 On your paper I want you to try all three strategies and convince us who is the fastest stepper. O.K.?

01:27 Let's do this. Let's do a quiet work time for about five minutes and then we are going to do full discussion in your groups and share out as a whole. O.K.? Five minutes.

01:38 What is the process? You don't have to have finished but what process have you chosen?

01:43 Well Sarah, I think wins, because if she takes twenty seconds to take thirty-two steps and Alex takes fifteen seconds to do twenty-one steps.

01:58 Then because I didn't know who won yet so I doubled it so Sarah got forty seconds in sixty-four steps and Alex got forty-two steps in thirty seconds.

02:18 So I think Sarah is the winner because Sarah only had ten seconds more of a lead than Alex.

02:30 I think Alex won because I made their times, ten seconds, twenty seconds, and fifteen seconds to the least common factor or something. I forget.

02:45 And made that to sixty seconds. Because all those numbers go into sixty. So for Joe he does sixteen steps in ten seconds.

02:56 So I multiplied ten by six to get to sixty seconds. And then since he takes sixteen steps you got to multiply that by six and that's ninety-six steps.

03:05 So he takes ninety-six steps in sixty seconds. And Sarah does twenty seconds so I multiplied that by three to get to sixty.

03:18 And then I multiplied her steps, which was thirty-two, by three to also get to ninety-six so they are like the same exact thing and then...

03:29 Alex he does it in fifteen seconds and fifteen times four gets to sixty. So I did his twenty-one steps times four so that gets…no wait…Oh no I did that wrong.

03:52 I don't know why but I thought he won and his steps times four gets to forty-four.

03:58 So Joe and Sarah are tied for the most steps. So Alex lost for sure. But they are tied.

04:14 So who do you think won?

04:15 Joe and Sarah because they are equal.

04:24 Since I got thirty…forty seconds for Sarah and she took sixty-four steps. So if Joe takes ten seconds in sixteen seconds…

04:38 then you have to multiply ten seconds by four to get forty seconds so then you have to multiply sixteen times four and since Sarah took sixty-four steps…wait.

04:58 I did unit rate to find the steps per second for Joe, Alex and Sarah. And for Joe and Sarah they both got one point six steps per second.

05:17 And for Alex he got four steps per second.

05:24 Mine is kind of like his except what I did was subtract the steps by the second to see how many numbers they are apart.

05:34 And it ended up that Alex end up to be faster than everybody.

05:43 How is that? Does that make sense to you? So you did the unit rate first off also.

05:52 So the second thing you did was compare them based on the number of seconds which is poster number one, right?

06:01 I'd like you both, together, to compare it based on the number of steps. O.K.?

06:12 Each of their rates based on an equivalent number of steps. Without using the unit rate calculations. O.K.?

06:22 So kind of the same approach you used for the seconds but I want you to talk back and forth so both of you have a clear understanding. O.K.?

06:30 What did you just do here?

06:36 Steps per second.

06:37 You didn't do per second. You did steps in...

06:40 Twenty seconds.
So all of your seconds here: twenty, twenty, twenty, were the same. Right? So that was a legitimate way to compare it.

Now I want you to use the steps as a comparison. All right? O.K.? Talk back and forth Kendrick. Don't bury yourself in that just yet.

...in twenty seconds and that's the same thing except just Sarah does ten more seconds but it's the same amount of steps except that...Sarah just does more...

Because she has more time and Alex is slow because he only does twenty-one steps in fifteen seconds.

So you have to get the seconds to sixty so Joe was tens seconds so you've got to multiply that by six.

And then his step, which is sixteen, you've got to multiply that by six and you get ninety-six.

And then for Sarah she has twenty seconds at her base time. And then you've got to multiply that by three to get to sixty.

Then you've got to multiply her steps by three also to get to ninety-six so Joe and Sarah are tied.

Then you've got to multiply fifteen times four for Alex to get to sixty seconds and then you've got to multiply his steps by four to get to forty-four seconds.

I did the same thing except I stopped at forty seconds not sixty seconds.

So I got sixty-four steps in forty seconds instead of sixty seconds.

How did you know that Alex was slower?

O.K. I knew Alex was slower because I added up his time, too. So Alex got fifteen...wait. Yeah, if Alex got fifteen seconds in.....

Yeah, O.K. yeah. If you got fifteen seconds then you multiply that...Well, I multiplied it by four...sixty...so he got...

I thought you were doing forty seconds.


You said you were doing it in forty seconds but then you said you multiplied by four to get to sixty.

I know. You get sixty seconds.

But you said you were doing forty seconds.

No. O.K., it took him sixty steps. He got sixty steps when the others got sixty-four steps. And he got that in forty seconds.

Alex got forty-four seconds, forty-four steps in sixty seconds so how could he get sixty steps in forty seconds?

O.K. he got...oh wait...oh wow...I got that wrong. So how did you get it, Michael?

O.K. Well, I already explained that to you I believe. Yeah, like four times. So, I multiplied the seconds to get to sixty...

And however many that was I multiplied the steps by that and that's how many steps they took in sixty seconds.

I get what you are saying.

Let's say there was another runner stepper or another stepper...Let's say her name was Zoe.

She ran for the same time as you.

So who do you think... Would you win or would she win?