

Class Day Four

Teacher: Okay, let me have your eyes just a minute. We've got a couple of groups that need to finish up their systems from yesterday and then we're going to talk about these. So if you could just give, those of you who are finished, obviously you don't have yours back so if you could just hang on for just a minute. And we'll let these groups finish and then I want to talk about these ways, okay?

Group 1 Nadira, Aleyna, and Brian

All finished

Group 2 Megan, Stephanie, and Shevba

Teacher: Okay, if you could somehow explain across the top how you did this. You understand?

Megan: Your name, I know it, Shevba.

Teacher: So tell me what you did and let's see if we could figure...

Megan: We added,

Teacher: Okay.

Megan: And divide.

Teacher: Okay, you added the rate, okay you added the rate and then you divided by two?

Shevba: Yeah.

Teacher: Okay, so can you put that on the top for me?

Group 3 Rob, Chris, and Alfred

All finished

Group 4 Sherika, Caleb, and Gionni

Gionni: Add them all up. Add them all up and you get your numbers.

Sherika: These right here?

Gionni: Add them up and you get these numbers.

Sherika: Oh.

Gionni: That's what you get when you add them up.

Sherika: Add the numbers.

Gionni: And you get these.

Whole class

Teacher: All right, so as I'm putting these last ones up what I would like for you to do is take a look at these different systems and look at two different things. The first one is, can you understand how they did the problem? How they took the data and came up with their list, from their equation can you tell? And number two, compare the

different ranks, see how close they are. Now there's a fifth one, and who's group did I not put up? Somebody's group is not up but it was just like one of these that's why I didn't put it up. Oh yeah, this group did it the same way as the first group, right? So I have it and it's correct, I just didn't put it up. So, let's start over here at this one. By looking at their equation, is it pretty clear how they got their list? Understand how they got their list? So, here's their order right here. This is group two. Do you understand what they did from what they wrote? Big voice.

Sherika: Rank plus rank and they divided by two.

Teacher: Right. So they did rank plus rank and then they divided it in two and here's their list. Now is it exactly the same as that list?

Students: No.

Teacher: Is it kind of close?

Students: No.

Teacher: Okay, so over here Nashville's number eight and here Nashville's number eleven. So you know it depends if you think that's close. All right do you understand what these people did?

Students: Yep.

Teacher: Okay, how is this one different from this one.

Student: They added rates and divided by two.

Teacher: And this one added?

Students: Ranks and divided by two.

Teacher: Very nice. Okay so, it looks like this one is really close to...

Gionni: That one.

Rob: That one's near ours,

Teacher: Yeah.

Rob: The first one.

Gionni: Yeah cause they got eight, they got Nashville ranked number eight in that one and that one.

Teacher: Yeah so Nashville came out the same place. I'm wondering.

Student: Three of them.

Gionni: But then again ours is like theirs, but theirs...

Teacher: I think we've got an arithmetic error right here. Yeah we do, we have an arithmetic error. Can you fix that for me Rob? Can you read it?

Rob: I've got it right here.

Teacher: You've got it right here.

Rob: It should be, what.

Teacher: It should be what?

Rob: Something's messed up with this thing.

Teacher: With what the calculator?

Rob: Yeah.

Gionni: I'll do it.

Teacher: Okay, we want to add 1,249.1 plus 5,204.

Gionni: It comes out one...

Rob: 6, 453.

Gionni: I got 16,453.

Teacher: I think it's six thousand, if you adding five thousand to one thousand it's six thousand. So it looks like that Santa Fe's actually going to be number one, now Boston's going to be number two and number three, it's going to change them all by one. Montgomery, and number four is Indianapolis, number five Des Moines, number six is Casper, seven ah that's where, seven is Pueblo and then Nashville is eight. So this way and this way came out to be exactly the same. But we shouldn't be surprised by that, why?

Rob and Gionni: Because they both did it the same way.

Teacher: Yeah, they both did it pretty much the same way. The difference is,

Rob: They divided.

Teacher: Yes, they took the average and they took the total. We already talked about that if you do that they should come out with the same way. All right, now, what about these folks, are we close here?

Rob: They added the ranks?

Teacher: They added the individual ranks. Uh-huh. So Nashville came out to be number eleven here. So it looks like in two of them Nashville came out to be number eight and in two of them Nashville came out to be number eleven. Now Tina asked a really good question at the end of class yesterday, because you noticed that these weren't all coming out to be the same, right? And you said how do they do it? How do they do it in the magazines? And when you said that I thought that was a really good question because part of what you're doing is called analyzing data. And when people do this, they have a reason for analyzing the data. So the Mayor wants to know if Nashville's safe or the police commissioner wants to know if we need more police. But we also have magazines that actually do this and this may be what you were referring to and it may not be, Tina. But this particular magazine ranks the best places to live in the United States. And they do that based on several different criteria and one of those is crime. So they actually do the same thing that you all just finished doing. And when they look at this, if you read it in here, it says that what they do is they take the statistics on crime and then they give each city a score based on that crime. So a high score is bad and a low score is really good, which is what's happening here. But what they said in their article was that when people are thinking about moving to a city, the one thing they're most concerned about is violent crime. They're most concerned about murder. So they came up with a way to look at this data, which you have been doing, that really paid really special attention to murder rates or death rates. So, when I was thinking about how you might do this, I kind of made up a problem that I want you to help me with. Okay, so I am going to need to take some of these down for right now. I need you to help me think about this. I got some cities here that, I just have three cities I want to talk about, but I think you might know some people that live in these cities. So I thought that might make it interesting, to use cities that you're familiar with, or that you have heard of. I've got to come up with a better system.

Rob: Just don't do that, just tape it up there.

Teacher: Oh, you, that's what you're saying, oh. So, I'm really wanting it to be neat and you all are just saying tape the sucker on the wall, right. I see.

Gionni: I've got a way to find out which one's the safest.

Teacher: What's that?

Gionni: Well, first you've got to look at all four lists and then you take all the rankings that each one ranked and you add them together. And the lowest one is the safest one and the higher they go is the not safest.

Teacher: Ah, so I could look at all the different systems and combine the results, is what you're saying. Okay.

Gionni: Yes, of each one.

Teacher: That's actually a really good idea. But let me ask you to take a look at this with me. Now, all right, all right. Neatness compulsion. Now let's suppose I've got three cities. I've got Metropolis, have you ever heard of Metropolis? You know anybody who lives there?

Student: Superman.

Teacher: Yes. What about Gotham City, do you know who lives there?

Gionni: Batman.

Teacher: Exactly, okay. Pleasantville, have you ever heard of Pleasantville?

Students: It's a movie.

Teacher: Okay, I found the statistics on those three cities and I just looked at the total violent crime and total property crime. And what I found out was in Metropolis, the total violent crime had a rate of 1,000 but there was no property crime. So it looks like a lot of people are killing each other, but nobody's stealing candy bars. But in Gotham City there was no violent crime and the rate of property crime was 1,000. So nobody's getting killed but a lot of candy bars are getting stolen. But in Pleasantville the violent crime rate was 500 and the property crime rate was 500. Now,

Gionni: Half and half.

Teacher: Exactly, so I was thinking if we look at the two ways that you all have been working on this and we take the total violent crime and the total property crime and we add them.

Rob: They're all going to be even.

Teacher: Yeah.

Rob: But it depends on the way that you um, which one you think is more important.

Teacher: Absolutely Rob. Because if I just do it this way they all come out to be even and I'm not sure that that's really telling the stories about these cities. If you had to pick one of these cities to live in, just based on crime, just based on crime, which one do you think you'd feel the safest in? Just based on crime, Caleb?

Caleb: Gotham City.

Teacher: Yeah, because if those candy bars are getting stolen that's okay, but you don't have much of a chance, or no chance of getting murdered.

Caleb: Because Batman's better.

Teacher: Because you like Batman better than Superman? I think he's doing a better job than Superman also. Okay, now if we do they way where we actually rank these, let's look what happens. This would be ranked number one, number two, number three and this would be number one, number two, number three. And when we add the ranks we get the same again. So I was thinking about this and I'm not sure that this happened exactly this way in the data that we were working on, but I thought that there might be a situation where a city had a whole bunch of property crime, a whole bunch of crimes that I wouldn't be as concerned about, that doesn't mean that I'm not at all concerned about, but a whole bunch that I wasn't as concerned about and very, very few violent crimes, but when I put these things together I couldn't tell anymore which one was which. So I was trying to think of a way that might let me note how important I think violent crime is. Do you have an idea of how we might do that?

Megan: Well I think that if I had a chance of being killed I'd probably look at you know, a 1,000 people are killed just about every 100,000 people so,

Teacher: Right.

Megan: I have a good chance of being one of those 1,000.

Teacher: You sure do.

Megan: So I think well, would I rather have something stolen or you know, have the chance of getting something stolen and something like have myself killed.

Teacher: Right, so you'd rather be here.

Megan: I'd rather be right there.

Teacher: Me too. Rob, did you have something, a different,

Rob: Well you could do like how many people have property stolen out of three and how many people of three are killed.

Teacher: Yeah.

Rob: Have them lower their standards.

Teacher: But they pull those people to the murders if they get murdered so they wouldn't be in that place, but that's a really good point, a really good point. Gionni?

Gionni: I kind of feel what Megan is saying just because that, if you have a lot of property crime, property can be replaced you know, and your life you can only live one time.

Teacher: That's right, unless you're James Bond right? Okay, yes ma'am. Megan?

Megan: And I was saying I'd probably look into age group too I mean if you're like planning,

Teacher: That's a good point.

Megan: To start a family. You will get how many one year olds are killed, how many two year olds and on up. And you can see okay, well I want to start a family and this might not be the place to live,

Teacher: That's a good point.

Megan: If there are five year olds, big five year olds are killed. You know I don't want my child to be killed so I'd probably look at, I don't want to live there if I have a chance of a family member being killed.

Teacher: That's true.

Megan: And then I'd look at the property value, and if you're stealing things that aren't cost maybe a quarter, dimes, or nickels and stuff like that, I would probably go ahead and live there because you know a nickel and a quarter together is only thirty cents.

Teacher: So what I'm hearing you say Megan, is that we got these six categories and some of these are a whole lot more important to you than the others, and somehow we've got to figure out a way in our system to reflect that we think this is so much more important to us than this. Not that we don't care about this but this is a whole bunch more important. So, so here's my question. How might we come up with a system that would show how important we think this is? Nadira?

Nadira: I don't know if this is right.

Teacher: Well, there's not a right way, there's not a right answer. There are so, I'm just looking for suggestions on how we might do this. We're all going to think about it.

Nadira: The important stuff you multiply by two just to like make it bigger or be more important looking.

Teacher: Okay. What do you think about what Nadira said? Nadira said I'm going to take violent crime and I'm going to multiply it by two or I'm going to count it twice because I think it's really important. Do you think that's going to change my outcome?

Students: Yes.

Teacher: Gionni, can you hold that question, let me do that? All right. So what we're going to do is we're going to say, we're going to take the total violent crime plus the total violent crime, we're going to take that twice, or two times the total violent crime because we think that's really important, and then we're going to add the total property crime. Now you understand that that's the same way to write those equations? That's really nice that you all understand equations that well. Okay, so that's going to give me, what's going to go here for this city?

Students: 2,000.

Teacher: 2,000, because I'm going to do 1,000 plus 1,000 plus 0. And here I'm going to do 0 plus 0 plus 1,000, and here I'm going to do 500 plus 500 plus 500 and so wow, it looks like that might have been a really nice idea Nadira, because now it's saying the people with the high crime, this city 's being rated the best, which is where Megan said she wanted to live, Rob said he wanted to live. Pleasantville is second best and this is turning out to be the worst, using your system. Gionni?

Gionni: Okay, going back to what Megan said, judging about how, what age group is getting killed the most, but then again you got to think about what age group is killing the most of that other age group. That's what makes my decision.

Teacher: That's right. Okay. But if we don't have those ages and all we have are these crime statistics, how can we work on that to get a better system? Now, let's take a look, Sherika can you help me and pass these out? Yes ma'am,

Rob: I'll help.

Teacher: And Rob will take half of them. All right. Now, I have up here the data on the second group of cities that you worked on. Two of the systems are still on the wall and you have a sheet at your table with the same information. So I want to go back and revisit Nadira's way of thinking about this, where we say we think violent

crime is much more important so we're going to count it twice. Times two, so let's just take Casper, Wyoming. Casper, Wyoming has a violent crime rate of 437 and a property crime rate of 5,796. Now,

Rob: That equals 6,630.

Teacher: Just the two numbers?

Rob: Yeah, you times two, you times two to that.

Teacher: Do me a favor, just add them, just add the 437 to the 5796 first, I want to know what that equals please. You got it?

Student: Yes, 6,233.

Teacher: So if I just add those numbers I get 6,233. This is the sum of this number and this number. Now, most of this number is coming from which one? Most of this 6,233.

Students: Property crime.

Teacher: Yeah, most of it because I mean almost 6,000, 5,700 is coming from this. So if I double this what's my new number?

Gionni: That would be 800 and...

Teacher: What is it? Times this one...

Rob: 6,670.

Teacher: All right now, if my new number is 6,670 most of that number is still coming from property crime, isn't it? What's happening, what do I need to do here? Megan?

Rob: Take off the property crime.

Megan: That's not working because some things like the violence rate is smaller than the property so you think well, no matter what I do the property is still going to come out more so, but I might look at doing was maybe doubling the property and like, if the property comes out to be more than the violent rate, you'll probably look at property more than you look at violence, because you think well, at least my things won't get stolen.

Teacher: I agree with you that the way these numbers are property is taking up most of this number. So is there some way I can make this be more important? Sherika?

Sherika: Don't add up the property together, don't add them together just take,

Teacher: Them separate?

Sherika: TVC together or the total violent crime together and then take all the numbers in the column and add them up and then divide um, then times it by two and then you take the number and divide it by two.

Teacher: Okay, so you're saying that if I just keep them separated then I can keep up with them.

Sherika: Yeah, you can keep up with them because like that it get confusing.

Teacher: It does but if I need to come up with just one number like they did in this magazine, I need one number to represent the crime, and I want violent crime to have more impact on that number, what am I going to have to do here?

Nadira: Okay, well, if you're going to add, if you're going to multiply each of the violent crimes by two, you already did that to that one, but that one, if the rate of the property crime is still high you already did what you did to the same one so that's still going to be the rate, you can't change the property crime. So just leave it, you already impacted, you already made the impact with the violent crime but it's just not as much so, but if you went over here and started messing with that then you'd have to do the same for the other one.

Teacher: Well, I don't want to start messing with this but what I'm saying is I want my impact to be more than it is right now, because if I look at this total, this is taking up most of it and this is not making a very big contribution and I want it to make a big contribution so that the final value that I get over here. So is there some way I might do that? Some way, Rob?

Rob: You could divide the property crime or times, divide it by two and still times the violent crime by two.

Teacher: So you're saying cut this one in half so it doesn't count as much. That's not a bad idea, I like that. So we could cut this one in half and would you still do this one by two?

Rob: Yeah.

Teacher: Okay.

Aleyna: It's still not,

Teacher: You're still not happy with it?

Aleyna: Property crime will still be,

Nadira: It's 3,725.

Teacher: 3,000, I'm sorry, that's if I divided by two and if I double this, that's divided by two. So I still got 3,000 and doubling this it's still 800 so Aleyna's saying I'm still not making it enough.

Rob: Actually you are because it went up to 3,000 something and it would have been 2,000 something.

Nadira: No that's the final answer when we added the property crime with it

Teacher: Okay, okay, okay, all right, sorry. But still half of this is what about 2,800 so it's still way more than half of this number.

Gionni: Can't you double the number you divided by?

Teacher: I could double, you mean divide these by four? Sure, keep making it, keep bringing them down. Or what?

Student: That's what I thought.

Teacher: Just keep bringing it down. Okay, so let's see, if I divide this by four that's going to get it down to about, can we do that in our heads? 57 divided by 4.

Megan: It's going to be 1,095.

Teacher: Okay and if I doubled that, that's at 870 so I'm starting to get, starting to get close. Nadira?

Nadira: Okay, I got something to say, just like in the first place because if you did that then it's not deceiving but then that's wrong because you, I mean...

Teacher: Okay, she, you're raising a really good point. So when I get through I have to declare the system that I used, so I have to say to people if you look at my data I thought violent crime was really important so I divided the property crime by four and I doubled the violent crime. That's my system. If you look at this system, you want to know how they did it because when I looked in this magazine and they said they ranked these cities, the first thing I wanted to know was how did you take all this data and turn it into one number. So, it can be deceiving if you don't tell people how you chose to do it and you should be able to explain why you chose to do it that way. That's what data analysis is all about. So we can do these things based on what's important to us, and we think violent crime is important but we have to be honest about it and explain our system. So that's an excellent point. So right now what I'm hearing you say is we're getting close if we do the total violent crime times two and then we do plus the total property crime divided by four. And we use that as our new value to rank the cities. That is a way, right?

Gionni: Yes.

Teacher: That's a way.

Gionni: That's a sensible way.

Teacher: You think it's a sensible way?

Gionni: Because you're evening it out by dividing by two, I mean timing that by two and dividing that by four.

Teacher: Right because I'm bringing this one down and bringing this one up. Trying to make them balanced, Megan?

Megan: Since we found the average of the other one, you can't change like you can't change the value or the placement as it goes.

Teacher: Okay, you brought up an excellent point. We spent a lot of time, I need everybody to pay close attention and help me with this. We spent a lot of time talking about the fact that if you total these and rank them you're going to get the same rank order than if you averaged them and ranked them. Right, we said that? If you take the value and you rank it and then you divide the value by two you're still going to get the same order. Now we're saying if you do these things it's going to change the order. Why is that? Why in this system will it change the order and change the values but over here it doesn't change the order? This is really, really important. You need to think hard about this. Megan you have an idea?

Megan: Maybe it's because like with those over here we didn't just take the numbers and you know like double some of them and then cut the other ones by four. And over here we're doubling the violent crime and then we're dividing the property crime. And it's not coming out the same because we aren't doing it the way it should be done because it's like two different numbers and it's two different things and you're making one of them seem more important by adding more and you're increasing the fact that the other one, still has, you know, a larger number.

Teacher: Right. Okay, I'm going to hold onto that thought and see what Sherika has to add and then I'm going to come to Aleyna.

Sherika: The numbers you're talking about cutting okay, what numbers are you talking about cutting the total property?

Teacher: We're talking about cutting this one by four and doubling this one.

Sherika: If you don't want to cut them you could just round them up, or round them down to make them smaller. The ones that are too large just round them and then that'll give you a smaller number too by cutting them.

Teacher: Well it would but my question is we had a really nice discussion the other day saying it doesn't matter if you total and rank or you divide and rank, you're going to get the same rank. But now we're saying that it does make a difference if you do differences to these columns right here and I'm trying to understand why that happens. Aleyna and then Rob.

Aleyna: Because you're not doing the same thing to both numbers. You're multiplying and dividing, that's two different things. That's why it's not going to come out the same.

Teacher: Rob, was that what you were going to say, or something different?

Rob: Yeah, and to even out this you could do the total violent crimes times four, that would make it even better because you're dividing the other by four, why don't you just multiply this by four.

Teacher: Okay, so you're saying that that would even put more emphasis on the violent crimes.

Nadira: That would equal it out because usually like, here when you do something to one side you do the same thing to the other side to even it out. That would make more sense and it's more logical.

Teacher: Okay, okay. I have to think about that.

Gionni: Need a calculator?

Teacher: I might, in a minute. Wait, wait, let me... I still don't think I'm not happy with my question. Actually I'm happy with my question, I'm still not sure we're clear on this answer. And I think what's happening is if you look at what we're doing when we average, we're acting on everybody's value, everybody's final value. And over here we're acting on the numbers that contribute to give us the final value. So when you, when you act on the numbers, or you change the numbers before they become the value that's when you have a chance to change the order. After you already have the value and then you act on the numbers the same way, that's when it doesn't change the order. Does that make any sense, does that seem reasonable? Rob, was that a yes?

Rob: Yes.

Teacher: Aleyna does that make sense what I just said?

Aleyna: I just, from the very beginning I don't get the point. It's still 437 and,

Teacher: All right let's do this, okay. Let's do this, let's which system do you want to use? Let's vote. Do you want to use this system or this system? How many want to use this system? How many want to use this system? Okay, all right we don't have a whole lot of contribution here. Megan?

Megan: Like when we get to choose things, why don't we do the same things and see which ones,

Teacher: That's exactly, all right. Well let's do that, yes Chris?

Chris: What is this system?

Teacher: This system says we're going to take the violent crime and multiply it by four and the property crime and divide by four. That's a very good question. This one says we're going to take the violent crime times two and then divide the property crime by four, so we have two different choices. But she's just suggesting why don't we do them both and see if we get a difference. So here's what we're going to do, we're going to have to go quickly. These three groups are going to do system number one, and these three groups are going to do system number two. Now, I'm going to give each person a different city, okay? Yes?

Nadira: There's no way, I think that you could do system number one and system number two and get the same answer because you're dividing the first one by, I mean multiplying the first one.

Teacher: Okay we know we're not going to get the same value, what we're wondering is if it's going to give us the same rank. That's what we're testing. We agree with you that we're not going to get the same numbers. Do you think it's going to give us the same rank?

Nadira: You get the value that's usually ends up to make out the rank. Over here when you got the numbers you just put them in order.

Teacher: That's right.

Nadira: So, no.

Teacher: You don't think they'll be the same or they will be the same?

Nadira: I don't think they will.

Teacher: I don't think they will either. But some people want to check and see. Plus they want to compare and see how this compares with the other way when you don't multiply or divide. Let's see if it makes a difference. Are you game? Well let's, can we just try this top one then? Can we just try this top one?

Nadira: That's the better one.

Teacher: Let's try the top one, so,

Sherika: The top one 'cause it's better.

Teacher: Yeah, let's do, we're going to do this one right here, so I need some people. Albany, right here. Can you do Albany, times four divide by four? Chris can you do Boston? Joe, okay, Rob, okay, Des Moines. Brian, Aleyna can you do Indianapolis? Nadira can you do Lincoln? Tina will you do Montgomery? Ashley can you do Nashville? Caleb, Pueblo, San Francisco, Santa Fe, Tacoma, now I want people to check. Nina would you check Albany and do it also? Stephanie can you do Boston? Shevba can you do Casper? And Megan I want you to do Nashville, I want two people to do Nashville. You multiply by four and then divide by four. Different numbers though.

Rob: I already got mine, what do I do?

Teacher: You sit patiently while I do this really speedy job of taping this on the wall. Okay, you're who?

Rob: Casper, Wyoming.

Teacher: Number?

Rob: 3,187.

Teacher: All right.

Student: It's 6,297.4.

Teacher: Okay, now here's the tricky, is that what you got? Okay, here's the tricky part, we've got to rank these and try not to skip one, let's go, come on, best to worst, smallest number. Where do you see it?

Gionni: Okay, I see the smallest number right at 3,625.

Students: 3,187.

Gionni: Oh, yeah. Des Moines.

Teacher: Okay so we done that one. And then,

Student: Lincoln, Nebraska.

Teacher: Lincoln?

Students: No it's Casper.

Rob: Then Lincoln.

Teacher: Okay, then it's Lincoln.

Gionni: Albany, San Fran.

Teacher: And pueblo's twelve. So, let's see. If you compare this to this over here, okay. Did it make a difference? Can you see that one over there and this one?

Nadira: It made a difference.

Teacher: It made a difference.

Gionni: Big difference.

Teacher: Big difference. Okay so...

Rob: It's only one difference from Nashville.

Teacher: It's only one difference from Nashville, you're right. But some of these really moved around, didn't they?

Rob: Montgomery came from three to seven.

Teacher: You know what that probably means, if Montgomery went from three to seven...

Nadira: They have a large property value crime.

Teacher: Yes, they have mostly property crime and so it was really, yeah, we have to talk about this, that right from three to seven because we made it less? Wouldn't that make the violent crime bigger?

Nadira: Isn't it the bigger the number the worse it is?

Teacher: Oh yeah, you're right. So the violent crime, you're exactly right. Okay, one minute, all right. Okay, so I have a homework problem for you. I'm sorry I'm just going to have to ask your indulgence and let me do this really quickly, okay? Can you pass those, Rob can you pass these out?

Gionni: When we get it, can we leave?

Teacher: Will you do me a favor, will you read through it and make sure you don't have a question and then you can leave, okay? Sherika's got some more.