This tutorial talks about the mean. The mean is one of many measures of center. The way the mean's calculated is by adding all the values and then dividing by how many values there are. Typically, when people use the word average, they're referring to the mean. However, any of the measures of center could be met by the word average, so mean is a more precise term.

Any time you hear the word average, you should get clarification as to whether it is, in fact, the mean that is meant, if possible. Now, let's look at an example. Before we look at an example, one important thing to note is this term summation notation. It's a way of compactly writing, add up all of these values.

It's also referred to as sigma notation, because we use this symbol-- a kind of funny looking E, which is the sigma. When you're doing sigma notation, there's indexing at the bottom. It says i equals-- and then it'll insert something here. And that's telling you where to start doing your counting and your inclusion in the sum.

And then it'll tell you up at the top what you go to. An n would be the last term, or the n-th term. And then beside it, you put what a typical value is going to look like. So here we're going to use x sub i. So what this is telling us to do is start with the x1, the first term, and add up all of those terms until you get 2x sub n, the last term.

So if we wanted to, we could use the sigma notation in order to tell us to do this calculation here-- in order to add up all the heights to our mean. And when we add up all of these values here, we get 385. So our sum for this problem asking about the heights in inches of third graders is 385.

Now, once we've found the sum, in order to find the mean, we need to divide by how many terms we have. So in this case, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10-- we have 10 terms, so we're going to divide by 10. And we're going to find out that our mean in this case is 385-- sorry-- the mean in this case is 38.5.

Now, with sigma notation, you're going to see that a lot more frequently in other level of math. So this first example is the one we already did. We already find out that the meme here was 38.5. Let's examine what happens when we add two higher values in and we change up our data set a little bit.

So here we have the 50 and the 47 that are a lot higher than most of these other ones here. And 47's not a lot higher than 42, but it's definitely larger. So we have a very similar example, except now we're including some values that may or may not be outliers, but are at least larger than what we

typically had before.

So let's start by adding up all the values. We add up all the values-- 50 plus 47 plus 40, and so on-- we end up with 472. Now, this time, we have 1, 2, 3, 4, 5, 6, 7 8, 10, 11, 12 terms. So to find the mean, we're going to divide by 12. And when we do 472 divided by 12, we end up with 39.3, repeating.

Now, our mean here ends up being higher. We get a higher value for our mean. It's 39.3. Because we have these values here, the 50 and the 47, that's starting to pull the mean up. And when we had really extreme outliers, that's going to pull the mean up even higher.

So when you have outliers, the mean is not the best measure center to use because those high-up values are pulling the mean up towards them and distorting the data a bit. One other thing that's important to look at for mean is the weighted mean. The weighted mean is when the data is weighted. The values have different importance.

In order to calculate a weighted mean, first, you multiply the value by its weight and then you add those weighted values. For example, if we have a student named Sam who's taking a class where the participation is worth 10%, homework's worth 25%, quizzes are with 50%, and tests are 15%, here the data is weighted.

Each of the values-- so a participation grade or a homework grade-- has a different importance, which is indicated by this percent here, the weight. So in order to calculate the weighted mean, we're going to need to do a couple of different steps.

First, we're going to multiply the value by its weight. So in this case here, the student Sam earned a 100% in participation, a 50% homework, a 70% in quizzes, and a 93% in tests, so we're going to multiply the scores that she received by the weight-- so 0.1 times 100, 0.25 times 50, 0.5 times 70, 0.15 times 93.

And then once we have those values, we are going to calculate what that is-- so 10, 12.5, 35, 13.95-- and add them all up. And the value that we get is going to be Sam's score in the class, as well as our weighted mean.

So when you add 10 plus 12 plus 35-- sorry-- 10 plus 12.5 plus 35 plus 13.95, you end up with 71.45. So this here is Sam's final score, as well as the weighted mean. This tutorial has talked about the mean.