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Hello and welcome to this short instructional video.

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This week density lab will require for you to calculate the standard deviation of your measurements.

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The standard deviation of a set of measurements shows the precision of your measurements.

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Precise measurements will be close together in value and will result in a small standard deviation.

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Imprecise measurements, on the other hand.

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Will have values that are far apart and will result in a large standard deviation.

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Calculating the standard deviation is not overly complicated.

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All you really need is the formula and of course a calculator.

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OK, at first sight this formula does look truly wicked.

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But once you know the meaning of the symbols, it's really not that bad.

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The S is obviously the standard deviation.

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That's our goal.

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We'll first look at the sum symbol shown here.

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This symbol tells us that we will be adding the result of the expression in parenthesis that follows it.

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“n” is the number of measurements.

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And “i” is the measurement designation, meaning first, second or third measurement (1,2,3, and so on all the way up to number n).

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Next we will look at the expression in parentheses.

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In this expression.

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X_i represents each of the individual measurements.

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And the superscripted X represents the mean, or the average of these measurements.

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We have already established that “n” is the number of measurements.

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So, the sum of the square of the differences will be divided by 1 less than the number of measurements.

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Let's look at an example in which four measurements of an unknown metal were taken and we will apply the above formula.

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These measurements, of course, are densities.00:03:16

Before we do, though, we will need to calculate the superscripted X.

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That is the mean of the four measurements.

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Next, we will add the square of the differences between the measurements and the mean.

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Notice that in each case.

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In each case we have subtracted the mean.

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And we've also divided by three, because “n” minus one is 3.

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Since there were a total of four measurements.

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So, Finally, we arrive at our answer.

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It is reported so that the last significant digit.

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Is 3 places after the decimal.

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The same as the mean.

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One last00:04:28

Why was the average density?

thing to ponder though.

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Why was the average density

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Reported to four significant digits

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When the individual measurements only had three each?

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Did I make a mistake?

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Or didn't I?

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And that's all there is.

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There isn't anymore.