



How to Average Numbers

NOTE: A link to the student version of this “How To” can be found in the student edition at point of use. It can also be found in the Student Resources menu at the top of the screen.

Averages are useful to scientists and students alike because they have predictive value. Students have probably calculated averages in math class, but they might not understand the relationship between finding averages and predicting events in the world around them.

The procedure for calculating averages is straightforward, and students should have little difficulty finding the averages of numbers. They might need practice, however, in interpreting what an average means. Help them understand that an average provides general information about a collection of data. An average provides a quantitative means for predicting what is likely to happen based on past events.

In the student version of *How to Average Numbers*, students are presented with tornado data for three states. These data cover the number of tornadoes in August over 5 years. The average number of tornadoes is calculated for Nebraska. Students are asked to calculate the average number for the other states. In Florida, the average number of tornadoes in August is 6.4. In Wisconsin, the average number of tornadoes in August is 2. Be sure that students understand that there is no “partial” tornado, so they should round off any numbers that do not average to a whole number.

Another important issue for students to understand about averages is the effect of extremes in data. An example is that in the year 2000, there were 60 tornadoes in Colorado. This is an average of 5 tornadoes per month. Note that this average does not reflect the relatively large number of tornadoes in May and July. Nor does it reflect that no tornadoes occurred in 7 of the 12 months in 2000. One has to examine more closely other patterns in the data. For this reason, it is important to realize what an average actually means and to consider other patterns or extremes within the data.

Also, help students understand that the reliability of an average increases as the number of data points in the sample increases. For example, if data were presented for the number of tornadoes in August for 25 years rather than 5 years, the calculated averages would be much closer to the actual occurrences. Larger data sets help diminish the effect of extremes in the data.