

Statistics and Probability

Statistics is the study of how data are collected, summarized, and presented. **Probability** is the study of chance.

Suppose that a student rolls two dice, adds the outcomes, and records the result; rolls again, adds, and records; and continues until 100 sums have been recorded. It is likely that the sums will range from 2 to 12 and that more sums will fall toward the middle of this range than will fall toward either end. The collection of sums is a data *distribution*.

The focus in statistics and probability at this level is to teach students about statistical distributions. Students will learn that a distribution can be described in terms of its center and spread. In the dice example, the center of the distribution is 7, and the range, which is a measure of spread, is $12 - 2 = 10$. The distribution will be roughly symmetric about the center. If students plot the results of the dice example using a histogram or dot plot, they will see how the shape of the distribution provides a picture of these features.

The distribution of sums can be used to make a probability statement about the next roll. But such a statement cannot be made about all kinds of data. In the dice example, every roll is an identical experiment. But, a distribution of the number of student absences in a typical school year does not tell us the probability of any particular student being absent, let's say, 3 times this year. The conditions and behaviors of one student are not identical to those of the next student. But, the distribution could tell us, for example, that about 4 out of 10 students will have 3 absences this year.

The Grade 6 Common Core State Standards for Statistics and Probability specify that students should—

- Develop understanding of statistical variability.
- Summarize and describe distributions.

The study of statistics and probability gives students ample opportunity to reason about real-world questions, to construct arguments, and to critique the arguments of others. The following hands-on activities will enable teachers to engage students in these practices.